

Mining

CONGRESS JOURNAL

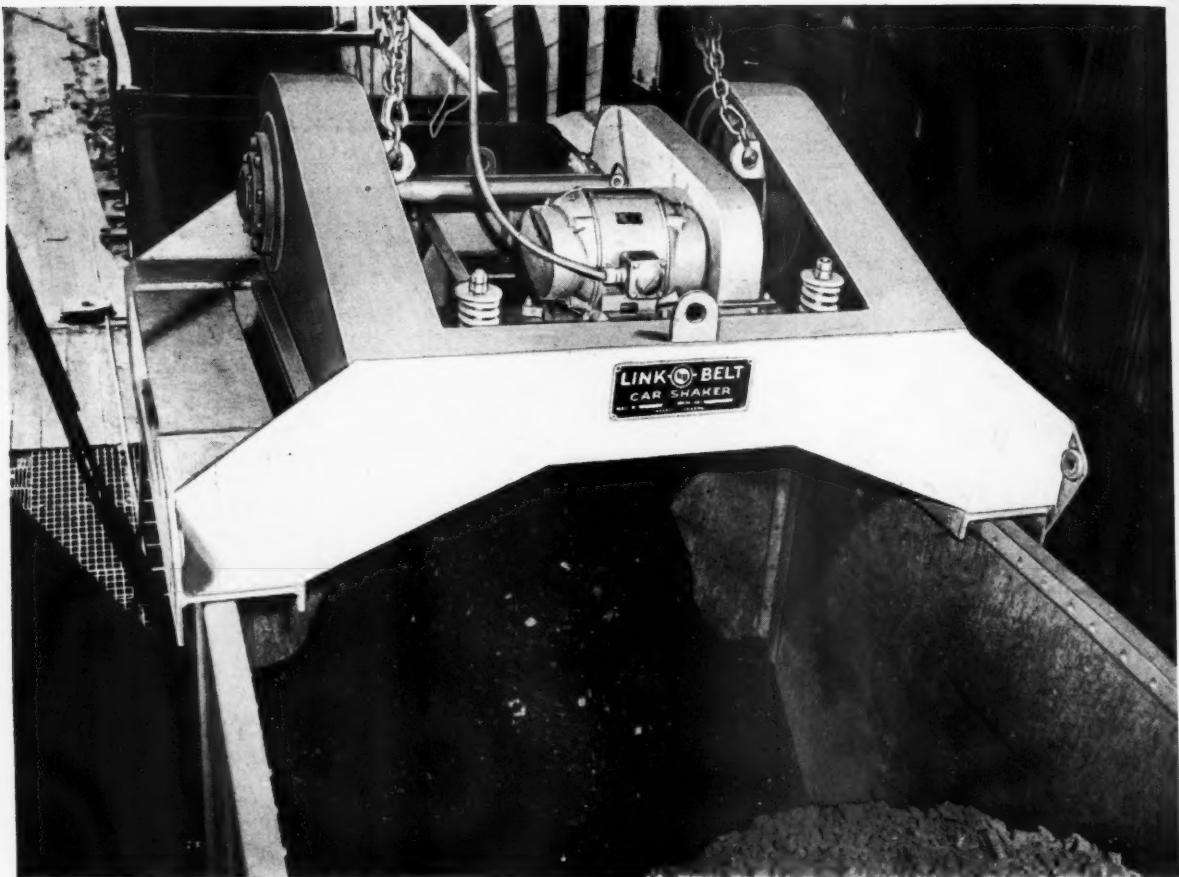
AMC

DECEMBER
1940



*Senate
Gardening*

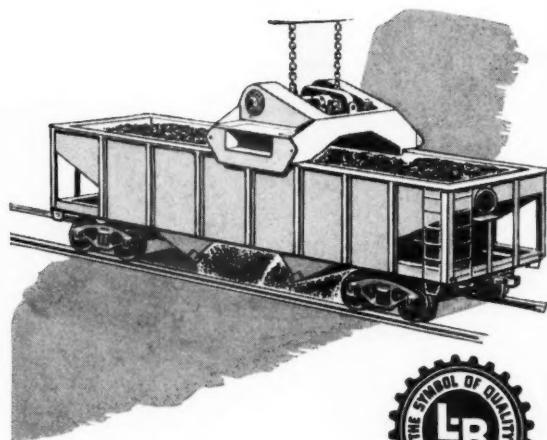




**Now, you can unload bulk materials from hopper-bottom cars--
"broom-clean" and fast with**

LINK-BELT CAR SHAKER

Lower the Link-Belt Car Shaker to the top of the car walls. Start the motor which delivers vibrations to the car sides and sloping hopper bottoms, loosening the material for easy "broom-clean" unloading in minutes. Reduce unloading costs and injury hazards and eliminate demurrage charges with this efficient unit. It is especially valuable for unloading damp or frozen materials. May we send you full information? Send for Book No. 2345.



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Offices in Principal Cities.

11,599



TIME . . . Mining's Most Vital Factor

Time never changes . . . but check up on its increased cost over the past ten years.

Down time today means costly, unproductive waste. Little wonder operators are looking for efficient, high capacity loading machines, such as the Whaley "Automat," that will consistently work the most hours, the most days, week-in, week-out.

The Whaley "Automat" loading machine is built to take the punching. It has a reputation for consistent, efficient operation over long periods with minimum delays. This fact alone makes it worthwhile for you to consider the Whaley "Automat" now.

THE AUTOMAT'S RUGGED CONSTRUCTION GUARANTEES AN ABSOLUTE MINIMUM OF LOADER BREAK-DOWN DELAYS.

THE AUTOMAT'S SIMPLICITY GUARANTEES A QUICK REPAIR AND EARLY RETURN TO LOADING.

RESULT—CONSISTENT, SATISFACTORY LOADING IN ANY CLASS OF MATERIAL.

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"Mechanical Loaders Exclusively for Over 40 Years"

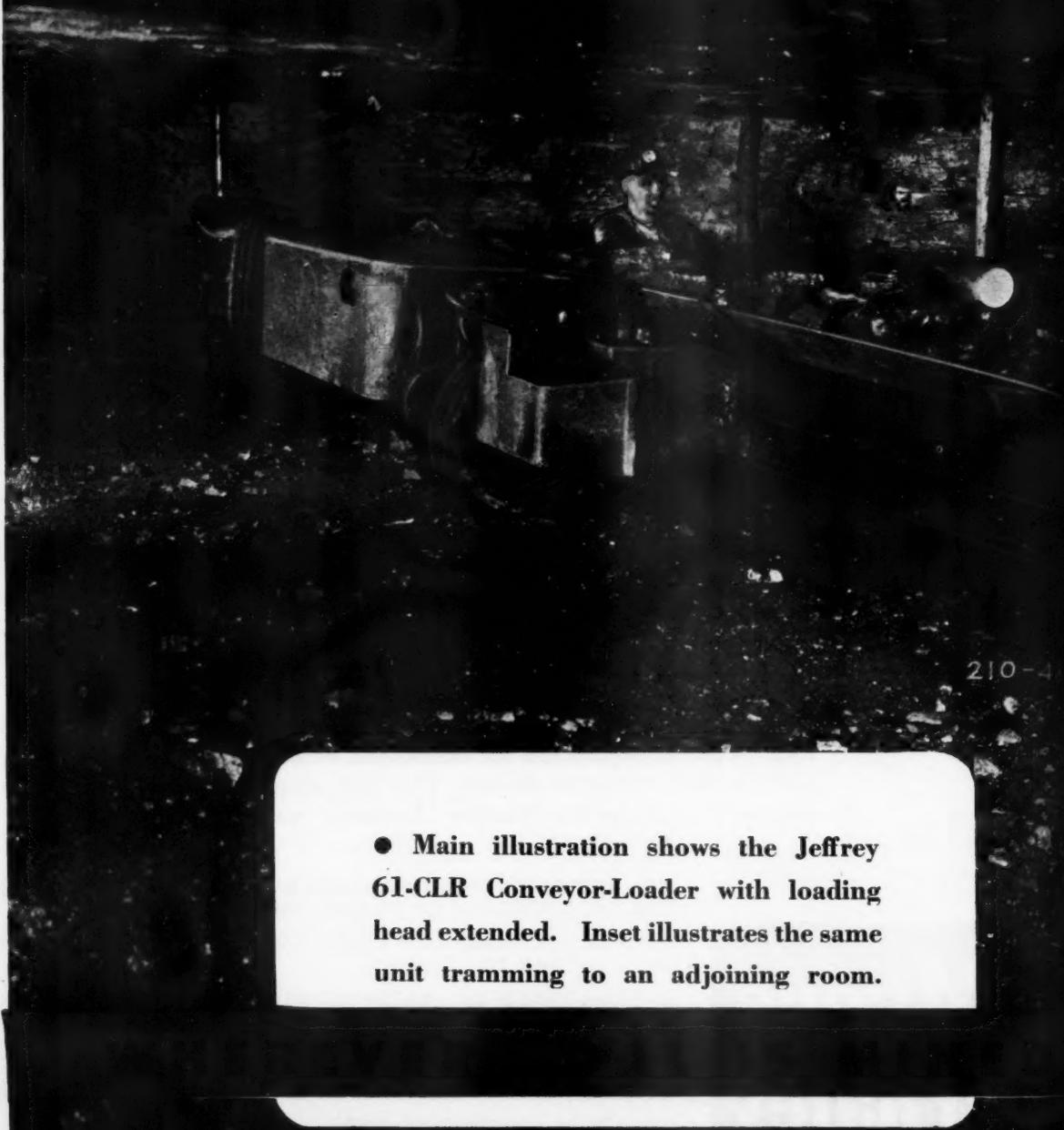
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TENNESSEE

THE JEFFREY MANUFACTURING COMPANY

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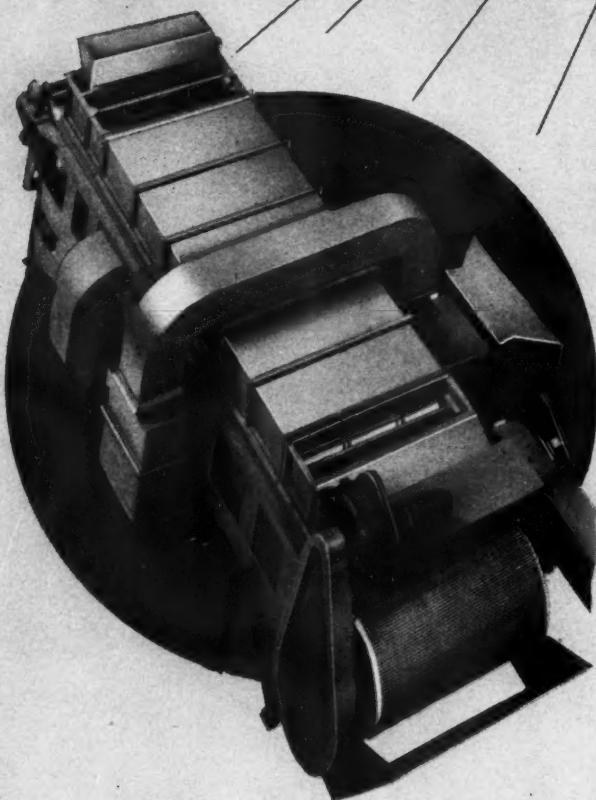
CUTTERS • DRILLS • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES • JIGS • FANS



- Main illustration shows the Jeffrey 61-CLR Conveyor-Loader with loading head extended. Inset illustrates the same unit trammimg to an adjoining room.



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THE AMERICAN MINING CONGRESS

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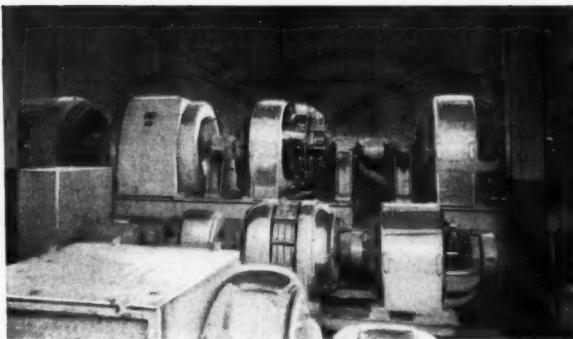
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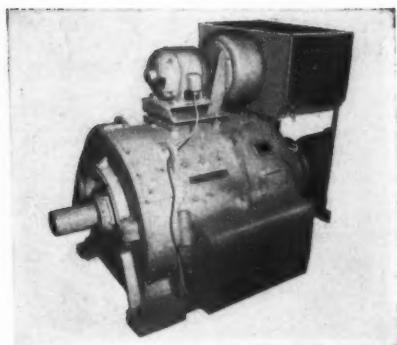
More earth moved in less time!

Substitution of a bucket with an approximate capacity of 46 cu yds in the place of its original and smaller one has made this Hanna Coal Co. machine, at Georgetown No. 12 mine, Ohio, one of the largest in the world. It is electrically equipped throughout by General Electric. Amplidyne control has resulted in substantially increased production. Though working on a 24-hour schedule, the shovel has lost practically no time for electrical maintenance since it was first put into operation in December 1946. More than 2500 shovels and draglines have been equipped with electric drive by General Electric.





Hoist, swing, and crowd generators are driven by a G-E 1250-hp synchronous a-c motor (upper level). Shown on lower level is the power-factor amplidyne, exciter generator, and swing generator, all driven by a G-E 200-hp induction motor. The amplidyne synchronous motor field, says Mr. E. Gaston, electrical engineer of the Hanna Coal Company, maintains optimum power factor at full voltage, and reduces line losses to a minimum.

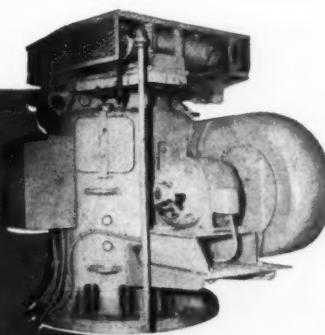


The huge bucket is raised and lowered by two G-E 425-hp MDP hoist motors, one of them shown here. Sturdy MDP motors incorporate such features as heavy steel frame to withstand severe service, dust-proof mountings for all bearings, improved banding and commutator design to permit operation at higher maximum safe speeds, and split frame to permit removal of top half for easy inspection of armature.

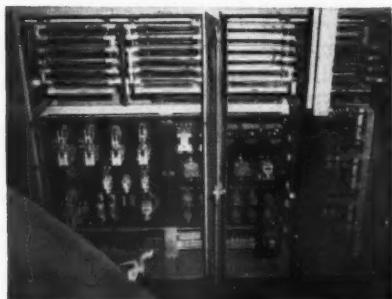
G-E amplidyne-controlled drive on Hanna Coal Company's giant stripping shovel provides faster hoist, swing, and crowd actions, works around the clock with minimum time lost for maintenance or repairs.



Amplidyne control of hoist, swing, and crowd actions gives the operator instant shovel response. It provides faster acceleration and deceleration to cut seconds off each pass and increase daily yardage handled. The three G-E amplidyne shown control the three shovel motions precisely. Even at high speeds, they prevent the excessive current and torque peaks which might damage electrical and mechanical equipment.



Swinging the shovel is the job of three G-E 125-hp MDV vertical swing motors (one shown at left). In addition to the main driving and control motors, some 30 auxiliary motors from 1- to 15-hp were furnished by G.E. for blowers, fans, oil pumps, steering, etc. Here an auxiliary Tri-Clad open dripproof motor drives the MDV motor's blower. Tri-Clad design and construction give three-way extra protection against physical damage, electrical breakdown, and operating wear and tear . . . proved by more than 1,500,000 Tri-Clads now in service.



Simpler and more compact, the G-E amplidyne control panel shown uses fewer control devices, and takes up less space in crowded quarters. During the past six years, modern amplidyne control has been engineered into nearly all large shovels and draglines equipped by General Electric. For better results, make sure your shovels have G-E equipment throughout. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC





G-200R Wagon Drills, mounting 4" drifters, run 24-foot blast holes

fast drilling at any angle

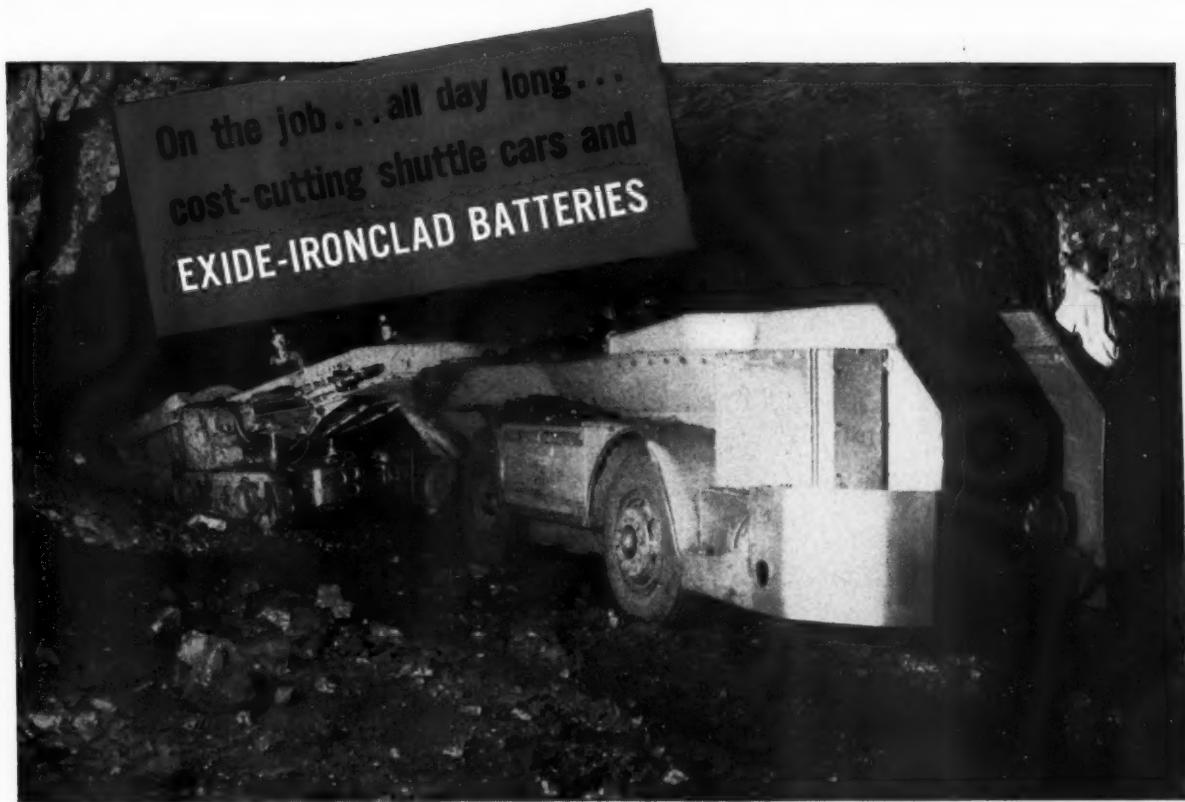
The flexible mounting of the versatile G-200R Wagon Drill adapts it for drilling vertically, horizontally, or at any desired angle — line drilling, toe-hole drilling or bench drilling. The sliding cone, with a 36-inch adjustment, offsets ground irregularities or uneven steel lengths.

The G-200R provides fast and easy operation of the more powerful CP drifter drills — with great reduction in drilling costs. Its CP rotary air motor gives a steady feed and quick return, with plenty of power for pulling tight steel.

The wheels can be quickly turned at right angles (tandem) to facilitate line drilling or drilling close to ledge or wall.

Available with CP-50N (3"), CP-60N (3½"), or CP-70 (4") drifters.





EXIDE-IRONCLAD BATTERIES are DIFFERENT!

Exide-Ironclad Batteries are different in CONSTRUCTION . . . in PERFORMANCE. The difference is due chiefly to the unique positive plate, which consists of a series of slotted tubes containing the active material. So small are these slots that, while permitting easy access of the electrolyte, they retard the active material from readily washing out or jarring loose. The result is a battery that assures peak performance with full shift availability and many extra months of service.

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POWER**

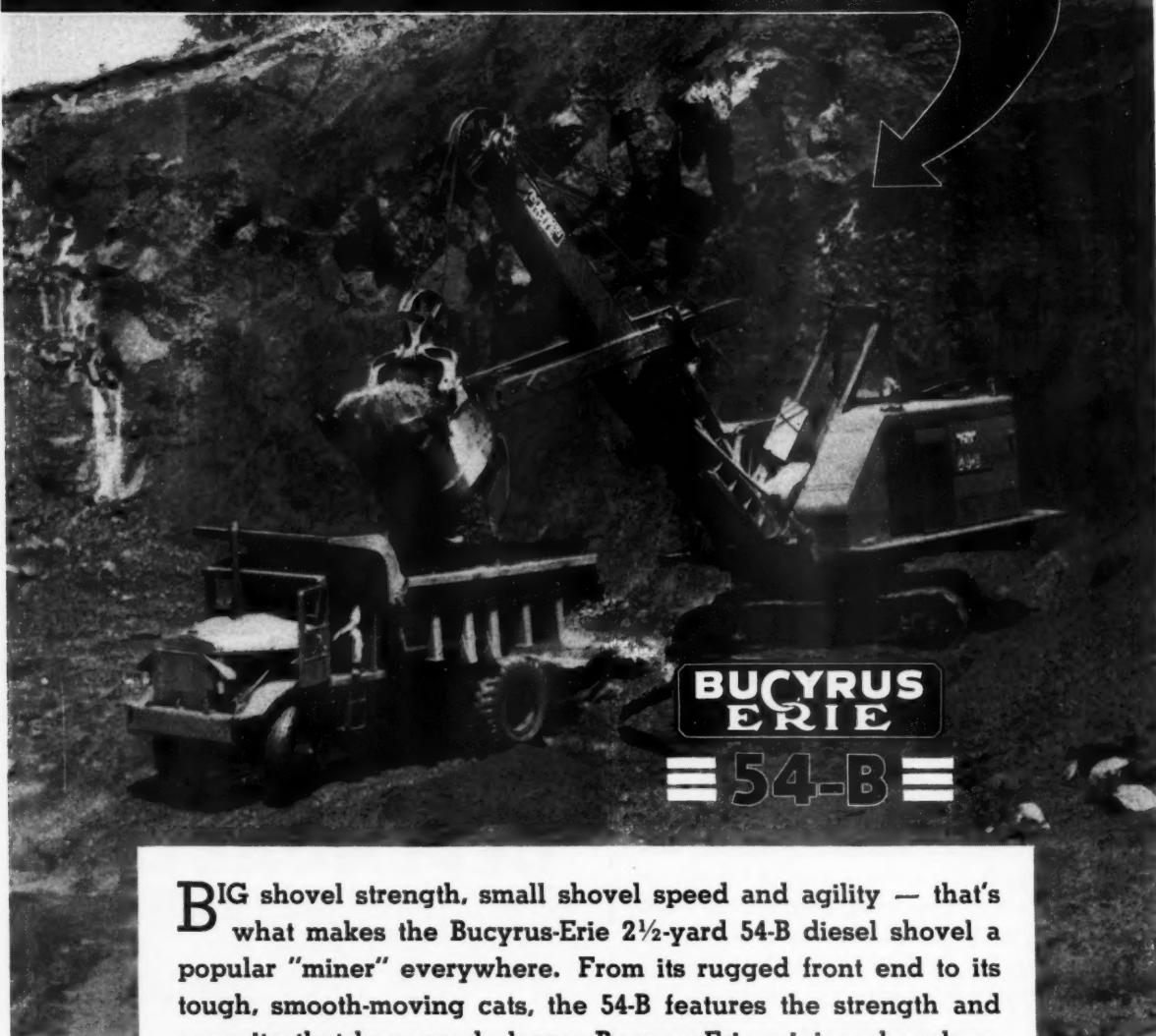


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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

Miner Worth Watching...



BIG shovel strength, small shovel speed and agility — that's what makes the Bucyrus-Erie 2½-yard 54-B diesel shovel a popular "miner" everywhere. From its rugged front end to its tough, smooth-moving cats, the 54-B features the strength and capacity that have made larger Bucyrus-Erie mining shovels so famous for durability, long life, and dependability. Control is of the same type that has made smaller Bucyrus-Eries so famous for speed and operating smoothness. Clutches and brakes are consistently responsive and smooth acting, give the operator the "feel" of the load, let him combine digging functions for a speedy coordinated cycle.

It's a combination that can boost your profits by lowering your loading costs. Get the complete facts on the 54-B — you'll see that it's the biggest digging-dollar value on the market!

187E49

BUCYRUS-ERIE CO. SOUTH MILWAUKEE, WISCONSIN

Announcing...

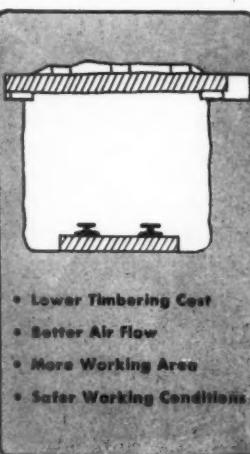
NEW Kennametal Hitch Bits

Here is a new bit developed by Kennametal that provides easier, faster, and more economical mine timbering. It drills nine and one-quarter inch diameter holes and can be used on mounted drills that have a capacity of 5 h.p. or more. Holes are drilled three feet deep in one rib and one and one-half feet deep in the other. The crossbar is installed by sliding it into the longer hole and sliding it back into the short hole. Timbers are accurately positioned and posts are eliminated.

The time, cost, and trouble of treating, hauling, cutting, erecting, and wedging posts are eliminated . . . air course efficiency vastly improved.

Your Kennametal representative will be glad to give you more particulars on this safe, fast, economical method of timbering.

Mining Division . . .
Kennametal Inc., Latrobe, Pa.



- Lower Timbering Cost
- Better Air Flow
- More Working Area
- Safer Working Conditions

Kennametal Hitch Bits are set with 10 "finger bits" having hard durable cutting edges of solid Kennametal Cemented Carbide. Tough body construction assures lasting service.

KENNAMETAL

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Send me a free copy of folder describing the new Kennametal Hitch Bit.

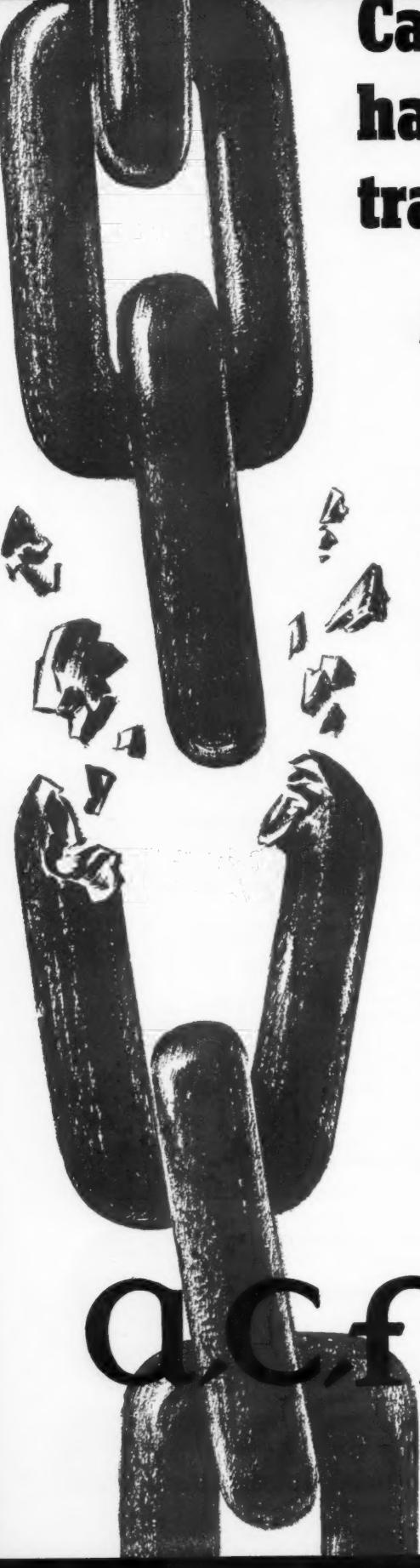
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Can a **WEAK LINK** halt your transportation system?

***Not if you have
MINE CARS!***

Continuous coal hauling and steady coal hauling are entirely different things. Here is why mine cars can be depended on to get the coal out *all day, every day.*

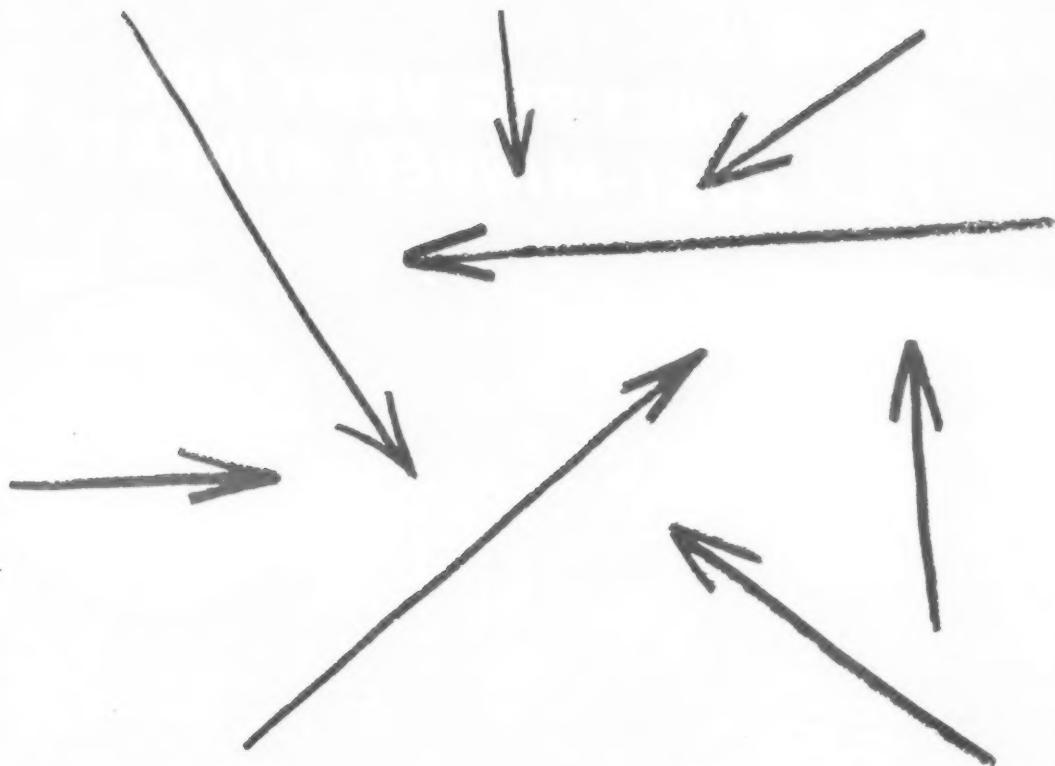
A well-thought-out system of mine car transportation will almost never delay coal hauling for more than a short time.

One weak link means only that one car is pulled onto a siding, or one length of track is replaced. Delays are measured in minutes, instead of hours. Every other mine car in the entire operation can haul coal at *full capacity*. Cutting and loading operations are usually not affected at all. Mine car repairs, when necessary, are made with ease, in the mine's own repair shop, with all necessary equipment right at hand. And practically all mine car repairs are *inexpensive!* It illustrates the fact that Q.C.C. Mine Cars are the cheapest, most dependable way to haul coal. Our Sales Representatives will be glad to give you the facts.

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Q.C.C., **MINE CARS**
for Greater Mining Efficiency

DROP BOTTOM • END DUMP • ROTARY DUMP



They're all the same to a TIMKEN® bearing

NO MATTER from what direction the loads may come, Timken® roller bearings carry them all safely—dependably. Timken bearings are tapered in design—carry both radial loads, thrust loads and any combination of them.

With Timken bearings in your product, auxiliary thrust bearings and thrust plates are eliminated. Designs can be simplified, space saved, cost reduced.

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whose products you know
by the trade-mark: TIMKEN



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PNEUMATIC
COLUMN

Crammed with outstanding features of safe and efficient operation! Air Bar Feed converts hand-feed Drifters—yes, and Sinkers tool—to fast efficient POWER FEED! Six speeds forward and reverse!

Fool proof Pneumatic Column simplifies drifting set-up. Built to stand up longer under severe use than anything in its class today!

Illustrated circular No. JE1132 tells complete story of these and other new cost-saving Thor air operated mining tools. Send for it today!

→ The new Thor Pneumatic Column and Air Bar Feed have been tested and approved at leading mines! Order one or both in on trial today. Prove by your own tests that never before have such tremendous savings been made available to operators of large and small mine drifting operations! Independent Pneumatic Tool Co., Aurora, Illinois

Thor PORTABLE POWER
TOOLS

ELECTRIC • PNEUMATIC

Profit by these advantages!

exclusive with Mack Six-Wheelers

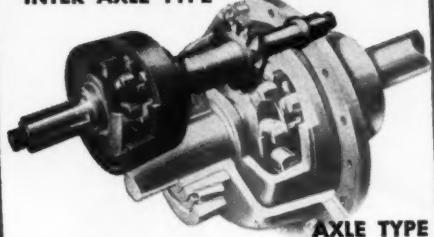
A Mack six-wheeler on your hauling job brings you profit-building advantages offered by no other make of truck—advantages that mean outstanding performance and economy.

Mack BALANCED BOGIE

Balanced Bogie—designed and built exclusively by Mack for Mack six-wheelers.



INTER-AXLE TYPE



AXLE TYPE

Mack Power Divider—exclusive in the Mack Balanced Bogie.

IT'S PART OF THE LANGUAGE



"Built like a Mack Truck"

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Limited.

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2. STAYS ON MORE DEPENDABLY!

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1. EASIER TO GET ON AND OFF!

A few blows of the drill and it's on!
A few blows of a hammer and it's off!
Smooth socket contours assure easy
detachability.

3. NON-CHOKING BACK FACE!

Back face is scalloped and rounded-off to prevent chips packing behind bit.

4. MADE OF TIMKEN ELECTRIC FURNACE STEEL

Fast Cutting.

Long lasting.

Uniform quality.

5. NON-RIFLING

The "X" cutting edge of the "Spiralock" bit prevents rifling in any ground.



NEW ONE-USE BIT WITH "SPIRALOCK" UNION

Latest addition to the TIMKEN® rock bit line offers unequalled advantages for many operating conditions

6. CROWNED CHISEL PILOT

Easier starting and centering.



7. SIMPLIFIES PREPARATION OF DRILL STEELS

Due to "Spiralock" union, steels last much longer — are easier to prepare and recondition. Square steel ends simplify fitting. They may be machined or forged.

8. ANY STEELS CAN BE USED!

Existing drill steels of any size and section can be easily and quickly adapted to the One-use "Spiralock" Timken rock bit.

For drilling jobs where bit reconditioning is impractical or undesirable, The Timken Roller Bearing Company announces a One-use "Spiralock" rock bit which takes its place alongside the famous Multi-use Threaded Timken rock bit that has been standard in the mining and construction industries for 17 years, and the Carbide-Insert Threaded Timken rock bit introduced more recently.

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Your best bet for the best bit for every job.



A NEW ALL STAR CAST



The new TD-24 offers you more horsepower than any other crawler tractor available today—180 hp. at the flywheel, 140 hp. at the drawbar—plus dozens of features found only in the new TD-24.



The new TD-14A has 60 drawbar horsepower and many mechanical improvements. Here is additional power to produce big payloads and cut your operating costs.



Famous for its power and dependability, the new TD-18A now gives you 87 drawbar horsepower. All the famous International diesel engine features plus the durable construction of this new International TD-18A make this tractor an even greater payload producer than ever before.

Your International Industrial Power Distributor is now ready to furnish you these three great new stars of mining power and payload production—the new TD-24, the new TD-18A and the new TD-14A.

The great new TD-24 is America's most powerful and versatile crawler tractor with unmatched features for easier operation and far greater work capacity. No other crawler tractor can give you all the features found in the new International TD-24.

And the other two stars on the new International

power-packed team are the TD-18A and TD-14A. Known for years for their dependable performance, these two efficient tractors have had their power increased to do more work, to operate with even greater ease and economy than before.

See your International Industrial Power Distributor now. Find out the facts and get these new tractors to work for you. You'll have an all-star cast on your strip or open pit mining line-up.

INTERNATIONAL HARVESTER COMPANY, Chicago, Ill.

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS



INTERNATIONAL INDUSTRIAL POWER

Here's the New GARDNER-DENVER

Hydraulic Drill Jumbo

for the fastest round you ever drilled!

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—No columns to place—no cumbersome blocking to handle.

FASTER from hole to hole

—Enables operator to spot each new hole quickly—right where the shot will give best breakage.

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—Release hydraulic pressure and the jumbo and drills are "on the way" to another heading.

These versatile, labor-saving Gardner-Denver Hydraulic Drill Jumbo units will increase your daily footage—will lower your drilling costs per foot—will give you faster, properly drilled rounds.

a jumbo for every job

Complete truck mounted jumbos are made with one, two or three drill booms and a roof jack unit, as shown. For special job requirements and large tunnel headings, equip your own jumbo carriage with Gardner-Denver hydraulic boom and roof jack units. They're available separately, in various lengths.

handle up to 10-foot steel changes

Versatile Gardner-Denver Jumbos may be furnished with chain feeds for 6-, 8- or 10-foot steel changes—enable you to take full advantage of modern tungsten carbide bits. Automatic screw feed guide shells accommodate steel changes up to five feet.

Other advantages of Gardner-Denver ADVANCED DESIGN

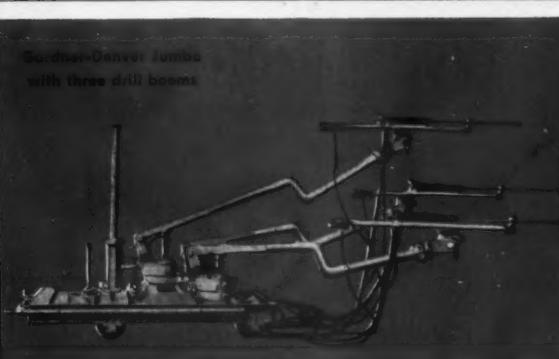
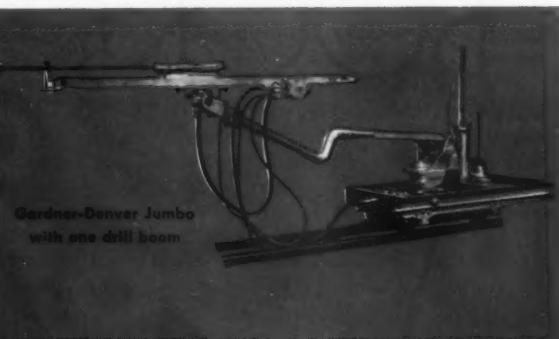
"Creep-free" Booms — right angle application of hydraulic piston pressure holds booms steady and true.

Offset Booms — reach lifters easily—without swinging the drill under.

Positive Hydraulic Roof Jack — holds truck stationary while drilling the round.

Closed Hydraulic System — low pressure type—any leakage past piston remains in the system.

Choice of Hand or Automatic Hydraulic Pump — Each boom or roof jack unit may be operated by its own hydraulic hand pump—or all units on a jumbo may be operated by a central, automatic, air motor driven hydraulic pump.



Write today for further information on the new
Gardner-Denver Hydraulic Drill Jumbo Units.



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how progressive design, sound engineering and durable construction have been the basis for more-profitable operation . . . **PREPARE FOR PROFIT** describes and illustrates modern R and S preparation equipment and processes. This section alone makes **PREPARE FOR PROFIT** a valuable reference book.

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ROBERTS and SCHAEFER CO.
130 North Wells Street
Chicago 6, Illinois

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Mining

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SHELDON P. WIMPFEN, Editor

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NUMBER 12

Half Century Perspective

Breathes there a man, with soul so dead,
Who hath not lately, sadly said,
Is this my own, my native land?

AT the turn of the century each of the 76,000,000 persons residing here had, as his share of the public debt, \$16.60. From this small sum the per capita national debt has grown to nearly \$1,800 for each member of our present 150,000,000 population. Even taking into consideration the depreciated value of the dollar, this increase in the debt is phenomenal. Worse still, nothing is being accomplished towards reduction of this public burden.

Fifty years ago, and for about a decade and a half thereafter, Americans exercised complete control over their earnings. If they wished they could invest their money in such ventures as the development of the automobile or the airplane, undertakings then considered foolhardy by the majority. Investment of surplus individual earnings developed mining and other basic industries to provide raw materials for conversion to consumers goods. The average standard of living rose to unequalled heights.

Now the increasing Federal demand upon private earnings has dried up venture capital. Incentive to save for the future has been reduced. Large groups have abandoned the proven precept of self help, and the clamor for security and pensions tends to drown out the principles of self-reliance, industry, productivity and thrift. The trend towards the welfare state, with the mirage of complete security for all, atrophies these virtues so essential to freedom and progress.

In the space of the last three years England has plunged deep into socialization despite the disillusionment that has followed each demoralizing step. Administration proposals here call for vastly expanded "social security," including a federal health program with compulsory health insurance; they also call for power to control the expansion of industrial capacity.

Funds for carrying out welfare-state proposals would necessarily come from the taxpayer's purse. Undertakings of this character offer business but little assurance that it will be allowed to produce without fear of increased government intervention. Public misunderstanding and weakened management

and investor confidence are beachheads for an overwhelming wave of socialistic projects.

Architects of the new order of things have placed floors under wages and farm prices. Ceilings have been set on rents and, by means of taxes, on profits. An unhealthy habitation has been built for competitive enterprise.

The involved regulations and interpretations surrounding much of our recent legislation subject business to confusing controls. Profits have been siphoned off by taxation including the double levy on corporate earnings. Incentive for new investment and employment of labor has largely disappeared.

Politics has fostered powerful labor monopolies whose leaders exercise complete control over entire industries. Tremendous economic power, even more than the government itself should have, has been concentrated in the hands of a few men, exercised through the medium of industry-wide bargaining and industry-wide strikes. Wages and benefits have been extorted out of proportion to labor productivity and with no regard for local conditions. An economy of uncertainty functions at the whim of a handful of labor leaders. Their absolute power to inflict industrial stagnation threatens the national health, safety and economy.

From the time of the inauguration of George Washington up to the taking over by the present Administration, \$179,000,000,000 were spent under 32 chief executives of the nation. (This sum excludes the extraordinary expenditures of the war years 1941 to 1945.) In the last five years our Federal Government has spent \$191,000,000,000, and now demands expenditure of more billions on vast untried projects. A profligate government, spending in excess at home and abroad, cannot be long supported without milking our economy dry. Further shrinkage of the dollar is the natural result of this desiccating process.

At the beginning of the 20th century, Americans were distinctive citizens of a land boasting opportunity for all and national growth on a basis consistent with the highest individual development. Government was the expression of the sovereign will of the people.

Time has brought many changes. Today the spirit of self-reliance wanes as too many people abandon opportunity for the promise of security. Individual progress has been curbed by reduced incentive. Big government, with increasing powers, regulates all too many segments of our economy.

The many outstanding Americans who hold that we have traveled far on the road towards collectivism find their observations well founded. Large numbers of businessmen and other taxpayers already feel the suffocating pressure of a paternalistic, powerful centralized government. Taxes and controls now in force can spread to further nullify the rights of ownership. Will we have reason to look back upon the present with its \$40,000,000,000 peacetime budget as a comparatively pleasant and carefree period?

Modern Practice in Block Leasing

By BROWER DELLINGER

Assistant Manager
Empire Star Mines Co., Ltd.

HISTORICALLY, the evolution of the leasing system is interesting, for leasing played a prominent part in the development of mining. It was first recorded in ancient Greece where the mines were considered as state property and were worked by the lessees who paid tribute to the state. This conception of state ownership of minerals was inherited from the Egyptians. Likewise, under Roman law all mines and minerals belonged to the state and were either leased through individual operators or were worked directly with slave labor.

This custom gradually spread throughout the European continent and by the 13th century had established a foothold in England. The early 13th century mining communities of Cornwall were chartered into corporations called "stannaries," which were leased by the Crown on a royalty basis. Gradually, landlords and miners replaced the Crown and the leasing system came under private control. It was from England that this system of mining was carried to America.

A. K. Hamilton Jenkins, in an excellent work entitled "The History of the Cornish Miner," quotes from an early 18th century English mining lease. In this instance the takers who were required to be eight men at least were

"to be at the expense of all working charges except pumps and keeping the engin in good repair, . . . to work the mine regular, to give the owners liberty to go underground and inspect, to put in good timber, to secure work, not to drive further than a certain point, and to have the use of tools and running

The Tribute System and How It Functions to Develop Mines

taykle, yielding them up in the same repair they received them." For these considerations the takers "Will Curnow and partners agreed to paye and laye out on the grass 2½ doals out of five doals of all tyn and tyn stuff raised or broke out of the said mine, spald and fit for stampin."

Shortly after the discovery of gold-bearing quartz on Gold Hill in June 1850 by McKnight, the tribute system was introduced in Grass Valley, Calif. During the transition from placer to hard rock mining, many of the first lodes located and worked ran into difficulties both financial and physical, and many of the claims or portions of the claims were let out on lease. It was this stubborn persistence of the early miners and their belief in their own ability to succeed that carried the district through these first years.

Leasing Maintained Continuity of Operations

The Empire Star Mines of Grass Valley have had arduous and varied times, but in each case, through the persistence of individuals and with the help of leasers, they have struggled through. These mines are situated in a small once-thriving gold mining town located by air line some 50 miles northeast of Sacramento, on the western slope of the Sierra Nevada mountains. The town was originally set-

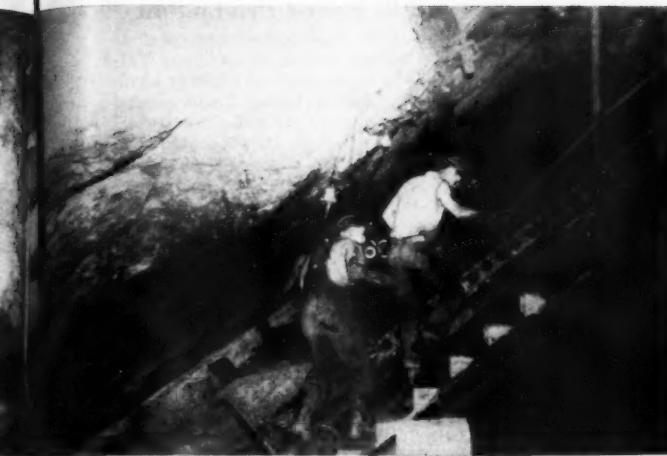
tled by placer interests, but in June of 1850 with the discovery of gold-bearing quartz, hard rock miners took over. For a time the ore was so rich and plentiful that the miners feared gold would lose its value. In October of that year, the Gold Hill, Massachusetts Hill and Ophir Hill (original Empire) outcrops were uncovered; the Gold Hill vein being recognized



Lessee and crew on Haley Lease, Empire Mine; expert miners, they enjoy a maximum incentive



Historic marker commemorates discovery of Gold Hill in 1850



Company provides leasers with equipment, material and transportation

as the first gold bearing quartz ledge discovered in California.

Empire Star Mines Co., Ltd., today is a combination of two of the more productive mine holdings in the area—the North Star group and the Empire group. Before consolidation in 1929, their combined production grossed more than \$96,000,000, and to date over \$136,000,000.

Veins of these two groups are situated in the diabase-granodiorite area.

ties had their lean years. In 1867 the mines of Grass Valley were supposed to be " petering out" and in 1879 the town was known as a worked-out, dying camp with but three mines in active operation; the Empire, the Idaho, and New York Hill (now part of the North Star). In 1880 the New York Hill closed down, leaving the fate of the camp to the Idaho and the Empire. During the year 1878, the Empire was known as a worked-out

levels. Near the end of that decade Starr returned from Africa to find an undeveloped mine. Through his guidance, a leaser by the name of Jim McKenna and his son drove the 2100 level of the Empire for one dollar a foot and the ore. This lease soon hit the famous North ore shoot and the ensuing thirty years elevated the Empire into one of the most prosperous gold mines in the world.

At the North Star, things were also in the doldrums. The company was driving the 1100 East drift and leasers were trying to eke out a living on a small show below the level. They stacked their ore along the drift until shipment time. One morning the rock had slipped, either from the blast or poor storage, and blocked the drift, thus holding up the drift men. Words followed as to who would clean up the mess and in the heat of the ensuing argument, the leasers "walked out" on their "tribute pitch." The subsequent lease cleanup was much better than anticipated by either side. In fact, it was so good that the company immediately ceased driving the drift and directed its effort in a winze which later developed the famed East ore shoot.

Leasing, as first experienced by the present Empire Star Co., took place in 1930 in the North Star mine, one of the oldest and the deepest mines in

Mine leasers, with their status as independent contractors, have contributed greatly to the virgin wealth of the United States. Some 10,000 miners in the Western states are working for their own account to find and produce new mineral supplies. Their ability, ingenuity and enterprise, left unhampered, will continue to be a potent power in finding and mining ore bodies which might otherwise be passed by.

They are narrow for the most part and gently dipping, averaging 10 in. in width and 35 deg in dip. Today, more than 30 of these fissures are being actively mined.

The original Empire Mine on Ophir Hill was discovered in October 1850 by George D. Roberts who bought the whole hill for \$350.00. Until Government Termination Order L-208 closed down gold mining in 1942, the mine had operated continuously for approximately 93 years.

The North Star vein was discovered in 1851 by two Frenchmen. By 1867 the shaft had reached an inclined depth of 750 ft and the vein had been explored underground for a length of 1000 ft. Production was intermittent until 1875 when the mine was closed.

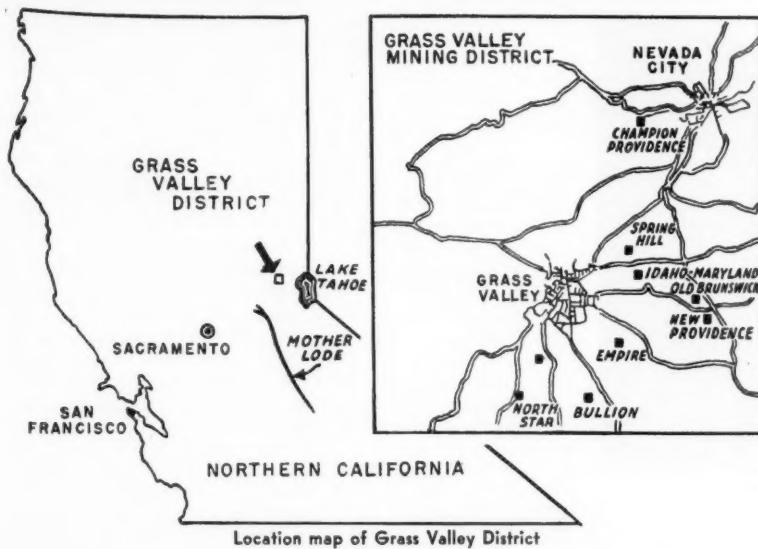
mine. But the fortuitous appearance of W. D. Bourne, Jr., in Grass Valley from Europe and his belief in the area and that the mines still had a chance was responsible for the continued effort to keep the Empire open. With the aid of new capital and the help of leasers, the mine gradually entered a new era of prosperity which was so successful that, in 1884, Bourne organized a company to begin the unwatering of the North Star mine. Leasers again played a large part in the program that followed.

In the 90's, both the Empire and North Star mines were benefited by industrious tributaries. The Empire bonanza was fading. Company production was at a low ebb and leasers were striving for a living in the upper



Mine Foreman Hampton and the author, right, make daily round of working places

the area. Many of these workings were situated great distances from the main shafts. They were along narrow veins, but in general they were high grade, and due to their remote location, adequate supervision on an employer-employee basis was not practical. For these reasons the company felt that the leasers could mine such sections more advantageously.



Location map of Grass Valley District

Incentive Encourages Leasers

Leasers are usually experienced miners who are able to follow the ore and who exercise more care in handling the mined material than is customary in company operations. They take pride in being able to perform these tasks better than company men and do not consider themselves to be even remotely classed as employees. The incentive for the skill, hard work and efficiency of leasers is the reward that is measured by a share of the ore returns.

Grass Valley leasers, in particular, are highly skilled miners familiar with the gold-bearing veins of the district. They are willing to take a prospector's gamble in search of and in extracting such ore as might be found in their lease blocks. These men have, either through environment or inheritance, obtained an independent status in regard to their livelihood. They believe this heritage of freedom to work for themselves to be of more importance than a steady job.

One must understand these traits which are part of every good American to realize the position a leaser considers he maintains. The lease blocks which are considered by the tributer to be his place of business are covered by written leases of six months' duration with a clause permitting renewal on the same terms. This written guarantee protects the prospective leaser's place of establishment. It is his business, his livelihood, and in almost every case is lived up to 100 percent. Except for a description of the leased ground, the written leases are uniform. There are certain agreed charges that have been arranged between the lessee and the company and they provide for equal shares for both lessor and lessee. Under this agreement, the company provides the machines, steel, timber,

engineering service, compressed air, accounting and the lease ground, and receives for this a royalty of 50 percent. The tributer furnishes his own powder, fuses, pays his own compensation insurance, milling and hoisting expenses and any other supplies he may deem necessary to facilitate a better return on his investment. Labor is furnished solely by the leaser. He may hire or fire anyone he sees fit. He is the complete and only boss within his specified lease block. The gold extracted by these lessees belongs to them. It is handled for their account by the lessor who does the accounting, and in so doing deducts the royalty or company share. All concentrates through milling are automatically sampled and settled for at 50 percent of the mill recovery, which at present is 94 percent.

L-208 Halted Production

One of the most unfortunate periods in the history of leasing at Grass Valley was brought about in October 1942, when Limitation Order L-208 closed down the mines. It not only terminated leasing, but it presented the Empire Star Co. with a tremendous problem of trying to keep the workings repaired, pumps running—all without adequate manpower, and with no assurance as to just what the future of gold mining might be. To try to keep a mine with more than 350 miles of underground workings in repair is no small item even in normal times. Financial cost of such an undertaking entailed a loss of more than \$250,000 a year. This figure was a direct cost and did not include future replacements to deteriorated pipe, tracks, caved stopes and manways.

Postwar Difficulties Solved by Leasing

With the cessation of hostilities and the government go-ahead for the resumption of mining, Empire Star found itself in a very difficult position to resume operations. Labor had become scarce and costly and the cost of supplies almost out of reason. All in all, it presented a rather unattractive picture and a decision had to be reached as to whether the mines should be allowed to fill with water. This would be the first step in liquidation proceedings, because with the tremendous underground areas to be filled, it would take six years of continuous pumping (with double the present pumping capacity) to restore the mines to working condition. Another alternative was to try to operate under the adverse conditions and continue to lose money. Block leasing was again established as the sole fa-



—Claude Ferguson, mining engineer, Grass Valley, Calif.
The Empire shaft taps workings over a mile deep

vable course of action. It was thought that by this method of mining, plus the incentive of opening new areas to leasing, enough of the better miners would be attracted back to the region to resume operations. Knowing the economical results of lease mining from previous experience, it was hoped that expenses could be met and the mines kept open for future operation. The plan was adopted on January 1, 1947, when the first leases were granted. There were relatively few changes made in the previous leasing system. Perhaps the most notable was the increase in the lease block size. This was done with the hope that the lessee might be encouraged to try some development work. Under the covenants of the lease, he has the right to mine or carry on any other development work by crosscutting, raising or drifting in search of new ore or undeveloped veins in his territory.

Present-day lessees are independent individuals. The lessee takes pride in being able to mine his blocks more economically than the company. Lessees are characteristically industrious individuals who, although not required to put in any specified time, always makes every minute count while underground. The realization that he partakes in the production imparts a sense of ownership and provides a strong mental stimulus to bring forth the best effort. A lessee generally works with a minimum of capital. Many are grubstaked by local merchants and townsfolk. This gives the community a keen interest in having an individual miner put his lease on a paying basis.

For the lessee, the problem of mill-

ing his ore has been simplified as the company has set aside a portion of its modern plant for treatment purposes. It is not compulsory for lessees to mill their ore in the company plant. But the rates are so attractive, 75¢ per wet ton, and transportation charges so nominal, 50¢ to 75¢ per wet ton, depending upon the distance hauled, that it is economically foolish to ship to any other custom mill regularly. Each lessee's ore is handled separately from mine to mill and all concentrates are automatically sampled.

Transportation of leasing personnel underground is furnished on schedule runs similar to bus service. This service is offered at specified times and saves the men from walking down ladders and otherwise losing time in getting to work.

To each lessee, the most important feature of leasing is his net return. To date, lessee's average earnings per diem are in excess of \$15 and in some instances earnings exceed \$5000 a year. Settlement is made by the company to the head lessee on the 10th of each month by mutual agreement. However, any lessee can get an "advance" on his shipment at any time and this is done more often than not. Head lessees settle with their own men either on a partnership basis or on some previous arranged schedule. Since that is a private affair among the lessees themselves, the company is ignorant of most of these facts. During the past year all of the lessees have organized their own safety program in order to benefit by reduced insurance premium. Under this program, they have decided to wear hard-



Total production from the North Star shaft, plus Empire output exceeds \$136,000,000



The New Brunswick shaft and mill of Idaho-Maryland Mines Corp. This company has produced more than \$65,000,000

boiled hats, hard-toed shoes and safety goggles. They take the U. S. Bureau of Mines first aid training course. Upon completion of this program, insurance rates should be reduced.

To date, leasing at the Empire Star Mines has shown gratifying results both to lessor and lessee. The lessee's return has been in excess of the current wage scale of the district, and has attracted many of the old-time lessees and better miners back to camp. At present there are 28 separate leases in operation. This has provided many company jobs for maintenance and service of the leasing program and has helped the district to maintain its oldest and most productive industry.

Weight Control in Coal Preparation

Some Aspects of the Control Problem and Equipment Used

By SAMUEL E. GLUCK

Geologist and Assistant Manager
Bonded Scale & Machine Co.

HIGH coal production costs have increased the demand for efficient coal preparation plants. The ultimate check on the efficiency of a coal preparation plant is whether or not the maximum percentage of recovery of clean salable coal is coming out. By comparing mine output and preparation plant products on a weight basis, positive checks may be obtained.

A simple comparison of net weights,

more than one mine car. Weighing beams can be set either at the end or the side of the scale, depending on the conditions of the installation. Two sets of rails should cross the platform: a set of live rails is supported by the scale mechanism and is activated by the loaded cars; a set of dead rails must be provided for the haulage motor to pass over and for empty cars to return across the

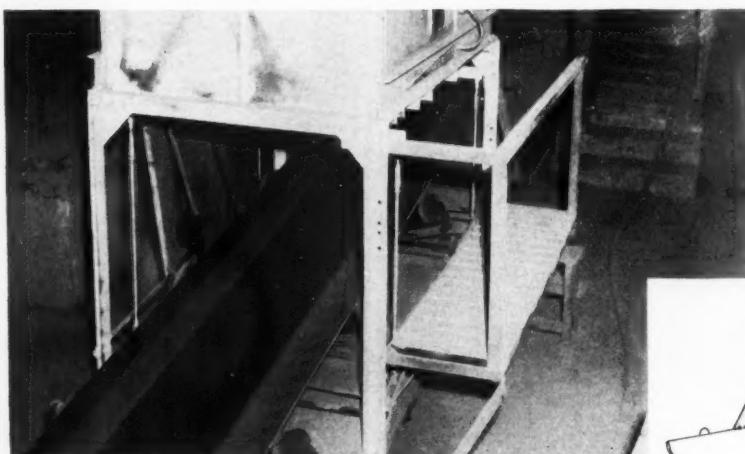


Fig. 1. This Merrick Weightometer weighs powdered coal moving on a high speed conveyor. Fig. 2 (right): Schematic drawing of a totalizing conveyor scale installation

using a minimum amount of equipment and only two check points, can give this answer. In any but the smallest operations these figures are of little value, as checks on the net difference between mined and marketed coal give no indication of the location of inefficient operations in the preparation plant.

Where the loaded mine cars are brought to the surface at some mines the tonnage is checked in two ways; by tipple weighing of cars, and in weigh-baskets.

Mine tipple scales are built with capacities of 5, 10, 15, or 20 tons. The larger capacity scales will take

scale to be reloaded.

A disadvantage of this method is that the tare weights of cars do not remain constant over a period of time. Repairs often account for the accumulation of an appreciable error in the tare and for this reason, the practice of weighing coal in weigh-baskets is increasing. A weigh-basket is simply an underground hopper, attached to a scale, in which the coal is placed prior to loading in the cars. The weigh-basket is maintained at a definite tare weight. At mines using weigh-baskets the coal is weighed again when placed in trucks or railroad cars for delivery to market.

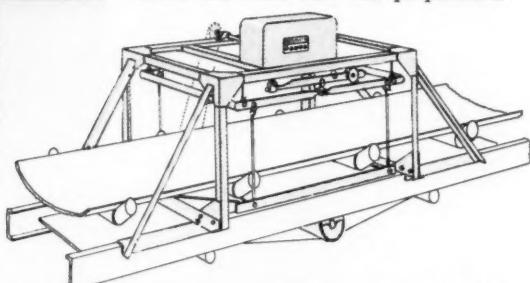
Weigh-Belts Take Continuous Record

In mechanized mines, with conveyors unloading directly into the plant, the problem is more complicated. If conveyor-loaded coal is to be weighed before picking and cleaning it must be done by an automatic device such as a weigh-belt. A "weigh-belt" is more accurately termed a totalizing conveyor scale. This is a scale built into a belt conveyor line. The weighing mechanism is housed in a live section supported by hanger rods and is of the same width as the conveyor frame. On this live section are two or more of the troughing idlers that support the belt. The loaded conveyor belt passes over this live part of the frame and an electrical and/or mechanical device totals the flow of material passing over the belt. Changes in the load on the conveyor and the speed of the belt are automatically compensated for in the mechanism. (Figs. 1 & 2.)

The term "weightometer" is often used in a generic sense, as synonymous with weigh-belt or totalizing weighing conveyor scales. Although this term is in common usage to denote a general type of equipment, it is actually the copyrighted name of one particular device manufactured by the Merrick Scale Mfg. Co. of Passaic, N. J. In this paper, for purposes of clarity, the term will be avoided except when specifically applied to the Merrick device.

A Scheme for Complete Control

Regardless of how the coal gets from the mine into the preparation



plant, proper weight controls should be established to monitor the efficiency. The following system affords virtually complete weight control in almost any kind of coal preparation plant.

The raw coal belt into the preparation plant should have a totalizing conveyor scale and automatic sampler attached to it. The total weight of the incoming raw coal is recorded; and samples for ash, sulphur, and moisture analysis are obtained at the same spot under virtually the same conditions. Inside the plant all belts should be equipped with totalizing

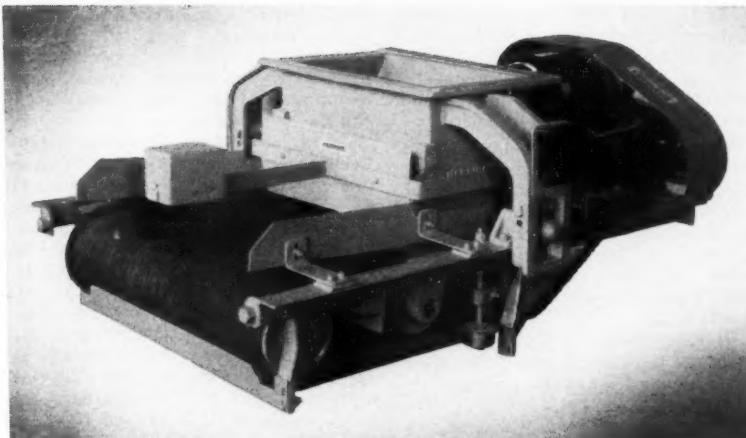


Fig. 3. Constant weight feeders should be used to control blending process

conveyor scales. This means the belts carrying the washed coal fractions and the refuse belt. Automatic samplers should be coordinated with these to provide accurate sampling for range analysis of all washed fractions. The refuse belt must have its load weighed and recorded, and be equipped with an automatic sampler for taking regular samples of the refuse. All samples should be collected and analyzed at least once an hour if control at all points of the plant is to be maintained.

By checking the weights of the sink and float fractions, the efficiency of the jig or sink-float separator is constantly monitored. The samples taken regularly from the various parts of the plant must be divided to give a representative sample for two tests; half goes to the laboratory for a range analysis and the other half is immediately taken to the sink-float laboratory. Equipment for weighing sink-float samples is inexpensive and small. A 50-lb capacity platform scale is best. It is important that the scale be accurate and that one beam carry one-half ounce graduations. What is really needed is a pan scale, but rapid corrosion of the pan by the samples makes its use virtually impossible.

Weight Problems in Blending

Two specific operations handicapped by the lack of weight control are the blending of raw coals prior to washing when producing a coking coal; and strip operations.

When metallurgical coal and coking coal are prepared by blending, the ash and sulphur content must be carefully controlled, by mixing exact amounts of coal of different analysis. This is often done in the raw state before the coal is washed. A common procedure is to feed from storage bins onto a central belt which then carries the blended raw coal to the

washing plant. It is still common practice to rely on knowledge of the approximate cubic content of the bins and to estimate the amount of the various coals being added to the blend on a yardage basis. This would be satisfactory if there were no variation in the analysis of the coal from a single bin over a period of time. This cannot be; the character of coal from one source often changes. That is why the analysis of the raw coals going to the bins prior to blending, and the accurate weight of the coals blended into the final product should be known. Totalizing conveyor scales should be used on the belt taking the raw coal to the bins.

As coal from the bins flows into the washing plant, the feed can be controlled by constant weight feeders (Fig. 3). These are generally positive drive apron or belt feeders, which consist of a travelling apron or belt on a steel frame. This steel frame is suspended on pivots below a hopper and the hopper is provided with a gate. Change in the position of the feeder frame due to a change of weight on the belt activates the gate so as to increase or decrease the amount of material on the belt (Figs. 4a-4c). The recording of the weight of material is done in several ways. A mechanically driven rate indicator will show the feed rate, the total weight fed, and in some cases can totalize batch weights. It is also possible to use an electric tachometer to indicate the feed rate in convenient units. This can also be furnished with another meter to totalize the weight fed. Many types of recording devices can be attached; card printing attachments and inked strip charts of various designs are easily installed. Where blending is from several bins, the constant weight feeders should be interlocked (Fig. 5). If material is not feeding from any one bin, either because of jamming or because the bins are

empty, the correct proportions will be maintained because the interlocking device causes all of the feeders to stop. If it is not feasible to install a feeder permanently under each bin, one or more feeders can be track mounted and moved under discharge gates of the bins as needed.

Weigh Control Problems in Stripping

There are certain factors inherent in the technique of coal stripping and the conditions under which coal is stripped that make weight control exceedingly difficult from the start of the operation. The huge tonnages that are handled hourly by shovels, scrapers, and draglines are often moved so quickly between the strip mining operation and the plant, that weight control is overlooked. Although some strip operators are putting weight controls in their coal preparation plants, many of them induce an error in their calculations at the start. They know the approximate capacity of their scoops and clam shells. These yardage capacities, roughly converted into tonnage figures, are often the only check on the exact amount of material mined. Less-than-full buckets, a miscount in the number of passes the shovel makes, and the inevitable tonnages of overburden stripped with

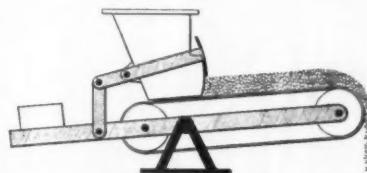


Fig. 4A. When material is lighter than that for which the counterweight is set, the gate opens to increase volume but weight remains constant

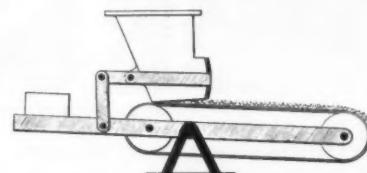


Fig. 4B. If the material becomes heavier, the belt tilts down, reducing volume while the weight remains the same

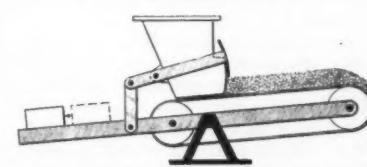


Fig. 4C. By adjusting the counterweight, a new point of equilibrium is set and the feeder will automatically correct itself to the new capacity setting and feed continually at constant weight

the coal that has to be picked later, are only some of the errors in calculation that the strip miner contends with.

When the coal leaves the preparation plant for the consumer's market, there must be a record of it. Because the coal is either loaded into motor trucks or into railroad cars, weight control is provided through use of a motor truck scale and/or a railroad track scale. In either case there should be a recording device attached to the scale that will furnish a permanent record of what is weighed (Fig. 6).

Scale Care Is Important

Regardless of what type of scale or weighing equipment is used, scales must be considered as the delicate instruments they are. A railroad track scale deserves as much careful treatment as a laboratory balance. If the following precautions are taken, weighing equipment will last for many years.

(5) Be sure that the weigh beam or dial is not sticking or binding.

(6) Avoid dropping weights on the scale or jarring the mechanism by pushing or driving loads roughly, and then snapping them to a standstill.

In addition to the above precautions the following check list is important in maintaining larger platform scales, either portable or fixed, and pit-type scales such as mine tipple scales, motor truck scales, or railroad track scales.

(1) Keep the weigh beam under cover.

(2) Keep the pit drained.

(3) All levers and structural steel should be painted at least once a year, or oftener if necessary.

(4) Be sure that all pivot points are free from material that might cause binding or slow action. Pivots that are not oiled will rust faster than pivots that are oiled or greased. On the other hand, ungreased pivots some times last the lifetime of the

errors are serious enough in an occasional inaccurate weighing of individual loads, but the multiplication of inaccuracy due to carelessness when using an automatic or totalizing scale can be very costly.

All apparatus related to the weighing mechanisms be kept clean. This is often not done with constant weight feeders and totalizing conveyor scales. Refuse is not brushed from the conveyor belt or feeder apron before the material to be weighed is put on it. Bins attached to batching scales require care. Bins are often not completely self-cleaning, and whereas the full weight of the bin's contents is recorded, part of the weighed material remains in the bin and the batch is short-weighted. It is also possible for the reverse to occur. Shut-off gates in weigh-bins that are not tight and positive in action will often allow dribbling of extra unweighed material to pass.

When a series of weighings is started on any device, the scale should be balanced, either empty or with the tare weight of the container taken into account, as the case may be. Although most scale operators do this when a series of weights is started, they often neglect to check on this balancing occasionally to make readjustments when necessary. Tare weights of containers should be ascertained before they are used and the tare noted on the container. If small variations have a notable effect on the results and if the tare weight of the container is altered by repairs, abrasion, or corrosion, the tare weight should be checked regularly and re-recorded.

Acknowledgments

The cooperation of the several manufacturers that furnished the illustrations for this analysis is acknowledged with thanks as well as the assistance extended by Orville Lyons, coal preparation division, Battelle Memorial Institute; Harold Medley and Robert Nestor, coal preparation division, Jeffrey Mfg. Co., and Alfred Paolini, Bonded Scale & Machine Co.

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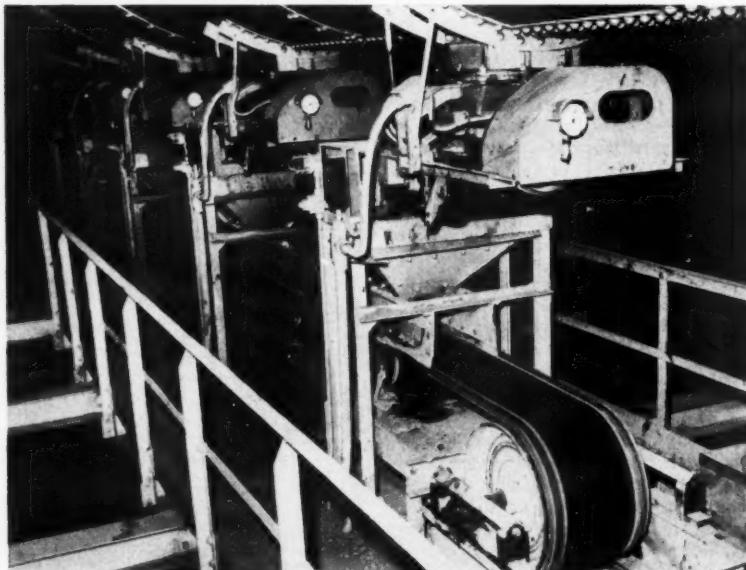


Fig. 5. A series of metered feeders used by National Lead Co.

(1) Keep the scale clean. The inside of the scale should be cleaned and inspected at least once a year unless unusual operating conditions require that it be cleaned oftener. Dusting should be done carefully with a cloth or brush.

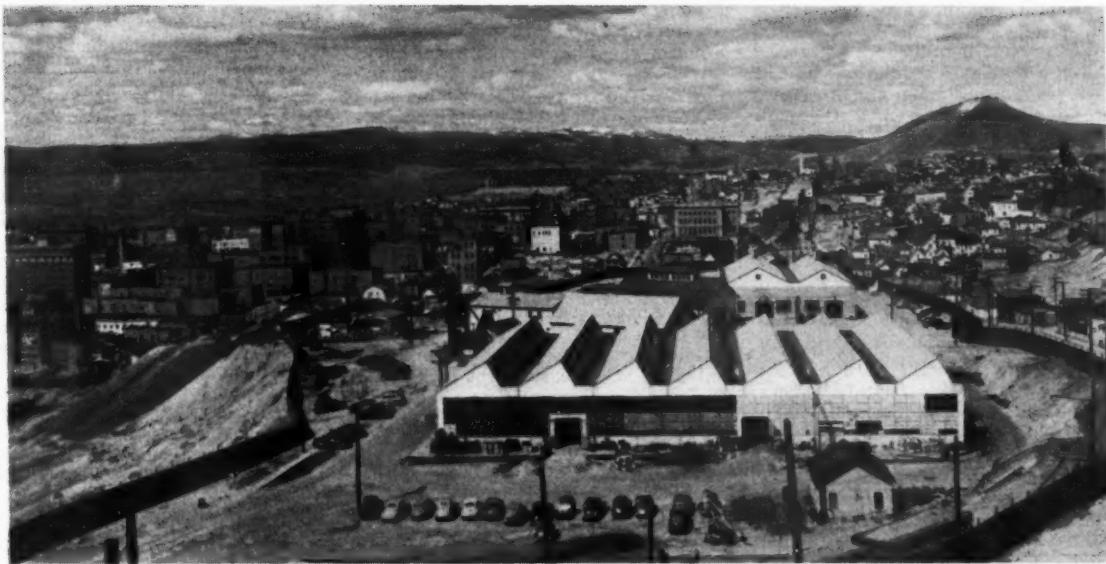
(2) Keep the scale dry. Rust inhibits the accuracy of any weighing apparatus and greatly shortens the life of vital parts.

(3) Be sure that the weigh beam is clean. Brush dust out of the notches of the weigh beam, but under no conditions file or scrape these notches.

(4) Be sure that the platform on which the material rests is free-floating and does not bind.

scale without replacement. Grease catches dirt and particles of the weighed material, and this foreign matter can seriously inhibit the operation of the scale. Some users have struck a middle ground by rubbing the pivots with SAE 30 motor oil. This successfully inhibits rust, although the oiled pivots should be wiped clean of all accumulated dirt every six months, or oftener if required. After the pivots are wiped clean they are again oiled with the motor oil.

Although the following suggestions for accurate weighing may seem elementary, it cannot be overstressed that there are many scale operators who sacrifice accuracy for speed. Such



The Butte mines machine shop and electric shop in foreground. Change house and electric shop warehouse, central rock drill repair shop, and Butte mines blacksmith shop immediately back of the machine and electric shop. Right background with "M" near top is Big Butte from which city gets its name. Center background is Montana School of Mines

Maintaining Mechanical Mining Equipment

Operations at Butte Require Extensive, Coordinated Service and Repair System

By A. I. HOEM

Mechanical Engineer
Mechanical and Electrical Department
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AT Butte, Mont., the present mining area extends for three miles from the Orphan Girl shaft on the west to the Leonard shaft on the east and for two miles from the Travona shaft on the south to the Badger State shaft on the north. Within this area are 20 hoisting shafts and 25 ventilation shafts. Winding, oil-surfaced roads connect the shafts and the various plants and shops. Most of the mines are also served by the Butte, Anaconda and Pacific Railway, and a few by the Great Northern Railroad and the Northern Pacific Railway.

In order to preserve the underground workings and keep them in a condition suitable for operation, continuous maintenance is necessary. Forced ventilation to the extent of 10,000 hp in surface fans and underground booster fans must be provided; an average flow of 5000 gpm of corrosive mine water must be removed; large air compressors, to provide constant supply of compressed air for actuating several units of an

aggregate of 40,000 installed horse power of compressed air hoists, must be operated continuously; additional electrical energy must be provided to actuate several units of an aggregate of 19,000 installed horse power of electric hoists. In addition, a large crew of men must be provided to operate and maintain this equipment and maintain shafts and workings.

Since the unification of the greater part of the Butte District under Anaconda ownership in 1910, an intensive effort has been made toward centralizing operations and standardizing the mining methods and equipment. This has resulted in the establishment of the following facilities:

Main Compressor Plants Serve Mines

Four large air compressor plants, the Butte Hoist compressor plant in the High Ore mine yard, the Leonard plant in the Leonard mine yard, the Never Sweat plant on Anaconda Hill

and the Bell plant in the Bell mine yard have an installed horse power of 24,000. A few small units serve the more isolated mines. The large plants supply compressed air at 90 psi through a 500,000 gal hydraulic accumulator and approximately 19 miles of interconnected pipe lines to most of the mines, and all shops. Normally about half the compressed air is used underground and the other half is used to run mine hoists.

Most of the compressors were installed at the turn of the century. The Butter Hoist compressor plant was built in 1910 and eight compressors were installed within the following two years. In 1917 three high speed compressors were installed in the Leonard plant, two at the Bell plant and one at the Never Sweat. About 1929 a 600 hp high speed unit was also installed in the Never Sweat plant. Older units in the three last

mentioned plants are rope-driven units.

Compressor maintenance is carried out on a regular schedule; one unit at each plant being taken out of service in its turn and given a thorough cleaning and check-over and parts replaced as required. The use of good compressor oil, properly applied, and the use of air filters on the inlet stacks have been instrumental in keeping the compressors in their present excellent condition.

Central Plant Heats Facilities

The central heating plant, located in the High Ore mine yard has six gas-fired, B & W, water-tube boilers rated at 457 hp each. Steam at 70-90 psi is distributed through well-insulated surface lines to most of the mines for heating purposes. A 100,000 gal tank of fuel oil supplies adequate reserve in case of gas-line failure.

Boiler water treatment compound is fed through either of two proportioning pumps which are driven by valve linkage on each of the two steam feed pumps.

Each boiler is operated for a period of 90 days when it is taken off the line, cleaned and inspected. Scale formation in the drums is limited to a thin film which is easily scraped off. Tubes are cleaned on an average of once per year. Most of the maintenance work around the plant, including pump packing and minor piping repairs, is done by the regular firing crew. Major repairs are handled by crews from the High Ore mine shops or the Butte Mines machine shop.

The High Ore Pumping Plant

This plant, located in the High Ore mine, is the central pumping plant. Mines are drained either through the old 2800 common drainage level or through the new 3800 common drainage level. There are four pumping stations; the 3900-level station, the 2800-level station, the 2200-level station and the final, or 1200-station. There are four 1500 gpm, high-speed, special-alloy, centrifugal pumps on the lower station. These discharge through lead-lined columns to the 2800-level station and the 2800 discharges through similar columns to the 2200-level station, the 2200 to the 1200, and the 1200 to the 300-level tunnel. The 300-level tunnel carries the water to the surface where it subsequently flows to the copper precipitation plants. On stations other than the lower or 3900 station, equipment includes quintuplex reciprocating pumps driven by 150 hp motors, and also includes centrifugal pumps.

Corrosion, wear, and ochre deposits account for the vast amount of maintenance work continuously required.

Plungers on the reciprocating pumps are turned down to a smaller standard size when they become worn. They are used again in certain pumps. Corroded parts are replaced by new or reconditioned parts. Pump columns and pump sumps which have accumulated deposits of ochre are cleaned periodically by the plant repair crew. This organized crew also makes all adjustments, replacements and repairs of all pumping machinery.

Phosphor bronze replacement parts for the plunger pumps are furnished by the Anaconda repair foundry; similar parts made of stainless steel are obtained from outside foundries. Special alloy steel replacement parts for the centrifugal pumps are obtained from the pump manufacturer.

The high cost of maintenance of large, corrosion-resistant, reciprocating pumps led to extensive research by a prominent pump manufacturer. The result was perfection of a high-speed, special alloy, centrifugal pump which occupies but a fraction of the space required by the reciprocating type and requires much less maintenance.

Precipitation Plants Are Mechanized

Two precipitation plants, the High Ore plant at the mouth of the High Ore mine 300-level drainage tunnel and the Leonard plant, south of the Leonard mine, use the launder system in which the mine water flows over scrap iron, steel, discarded railroad rails and shredded tin cans. For years the removal of copper as it formed on the iron in the precipitation launders was accomplished by hand sweeping with special large brooms. This method was not too effective since only the exposed surfaces of the scrap metal could be reached by the brooms.

A few years ago a hydraulic slusher was devised to recover the copper more efficiently. An electrically-driven track-mounted car runs between the launder sections; on it is mounted a 10 hp special alloy pump. The car travels up and down stream and agitates the water in the launders by slushing with multiple jets. The induced turbulence caused by the action of the jets effectively scour all surfaces of the metal scrap. The machine is entirely automatic and traverses up and down the section as long as the operator desires.

A railroad crane traveling on tracks has third rail power pick-up. When equipped with an electromagnet it is used for charging launders and, when a clamshell bucket is substituted for the magnet, the crane loads cement copper into railroad cars for shipment to the reduction works at Anaconda. Maintenance work for this equipment is done by men from the main shops.

Mine Air-Conditioning Plants

Two mine-air conditioning plants, one at the Mountain Con mine and one at the Original mine have a total capacity equivalent to 2700 tons of refrigeration. The relatively low humidity of the Butte atmosphere is used to cool certain working places underground. Water or brine, circulating in a closed system of piping and underground cooling coils, is cooled in pre-cooled-air cooling-towers to a temperature below the wet bulb of the surface air.

Routine maintenance includes treating circulation water to inhibit corrosion; cleaning out spray tubes in towers; cleaning spray nozzles and heat absorbers underground; plus the normal attention required by surface and underground fans and circulating pumps. Most of this work is done by regular crews at the mines.

Rocker Plant Frames Mine Timber

At Rocker, Mont., about five miles west of Butte, all square-set timbers are framed on automatic gang-saw machines. Mine ladders are also assembled there. Shaft and station timbers, mine ties and railroad ties are given wood preservative treatment in pressure tanks.

Routine and minor repairs and replacements are done by men at the plant although major work is done in Butte or crews sent from Butte.

Machine and Electric Shop

The largest shop in the area is located in the old Parrot mine yard. Built in 1941, it is modern in every respect and is equipped to handle nearly every job encountered in the Butte mining operations.

Routine work includes underground locomotive repair and overhaul; locomotive storage battery checking and reconditioning; high-speed ventilation fan overhauling and testing for balance; timber hoist and slusher overhauling; mechanical loader overhauling; pump overhauling; and electric motor overhauling including armature rewinding and testing. In addition to the routine work there is always a vast amount of construction work to do along with miscellaneous and emergency repair work.

Blacksmith and Boiler Shops

Just west of the machine shop is a modern brick structure equipped with gas-fired forges and gas-fired forging, annealing, and heat treating furnaces; air hammers; drill-sharpening machines and all forging appurtenances. There is also a rig which is used for checking the functioning of mine-cage safety dogs.

Routine work in this shop includes

making and sharpening all forms of mine hand tools, making mine track switches, detachable bit knock-off blocks, timber chain units, skip and cage forgings and repairs, mine cages, shrinking on locomotive tires and miscellaneous forging work.

Boiler Shop

The boiler shop is located on Anaconda Hill near the Anaconda shaft. Routine work consists of making locomotive battery boxes, chutes and chute lips, mine structural steel work, vent tube connectors and surface tram car bodies. Considerable miscellaneous sheet-metal work and welding is also handled.

Welding and Rock Drill Repairs

The welding shop is used primarily for building up worn locomotive tires. This is done on automatic lathes by arc application of special welding wire. Electric welders are available for handling miscellaneous welding.

In the rock drill shop, located in the old compressor building of the Parrot mine, some 1800 rock drills are repaired, reconditioned and tested.

Each machine is given a serial number which is stamped on a brazed boss on the side of the cylinder. A card record for each machine carries the identification and complete history of all repairs made, together with dates.

When a machine requires repair work, a white tag is affixed to it at the mine and the machine is sent to the shop. Upon completion of repair work, a blue tag is fastened to the machine and it is returned to the mine. A complete stock of new or reconditioned replacement parts is kept on hand for all types of machines. A thorough overhaul requires an average of only one hour per stoper or three hours per drifter.

Hawkesworth Drill Shop

As the Butte mines increased in depth and hoisting facilities became stressed, much time was consumed and trouble experienced in hoisting

and lowering conventional drill steel. This condition was responsible for the development and subsequent successful usage of the Hawkesworth detachable drill bit. In 1928 the bit proved so satisfactory in trials that the company purchased the plant and facilities of the Hawkesworth Drill Co. together with rights to manufacture.

The old Diamond mine machine shop was selected as a site for the new enterprise and it was completely equipped with forging machines, milling machines, heat-treating furnaces and bit grinding machines. In 1938 the Hawkesworth bit was abandoned in favor of the Ingersoll-Rand type and the shop was changed over to its manufacture by the addition of a turret lathe and an automatic chucking machine which replaced several milling machines. At present the shop stocks and distributes the Liddicoat bit and manufactures and reconditions drill steel.

The Original Garage

The original garage occupies some of the buildings formerly used for the Original mine. It houses, services, and repairs all automotive equipment.

A complete record of repairs, mileage, and operating costs is kept for each unit. A chemical analysis of gasoline in the main storage tank is made each month to guard against use of below-standard fuel. There are 122 units in service, including 28 passenger cars, 2 ambulances, 88 trucks, 1 road oiler and 3 concrete mixer trucks. Nineteen carloads of gasoline were used in 1948 and mileage totaled about 777,000 miles.

Construction and Paint Shops

The Anaconda construction shop and the Anaconda paint shop on Anaconda Hill and the Leonard construction shop in the Leonard mine yard, in addition to doing all shop work connected with new construction, also keep all buildings in repair, do all painting of surface machinery, buildings, and automotive equipment.

The Concrete Batching Plant

In 1948, a modern concrete batch plant was built on the Butte, Anaconda & Pacific Railway, between Hungry Hill and the High Ore mine yard. All concrete used in construction work on the surface and for bulkhead construction and foundations underground as well as for shaft lining is mixed in this plant and delivered to the job or shaft collar in concrete mixer trucks.

Mechanical equipment includes a cement pump, weighing machine, conveyor and bucket elevator and these are maintained by crews from the main shops.



Machine shop is well equipped to tackle any mine job



Electric shop rebuilds motors of all sizes

Warehouse, Sampler, and Rope House

The warehouse is located on a spur of the Butte, Anaconda & Pacific Railway at the top of Anaconda Hill. In it are kept adequate stores of supplies for use in every conceivable operation of the mines and shops.

The Washoe plant samples ore from the Butte mines and custom ore, prior to shipment to the reduction works at Anaconda. Routine maintenance work is done by the mill crew and major work is done by crews from the main shops.

The rope house is located in the Diamond mine yard and is the headquarters for the "Rope Gang." Here also is the shop where flat hoisting cables are made up and reconditioned.

Canvas and Hose

Adjacent to the rope house is the canvas shop which makes up vent tubing; canvas sacks, including powder sacks, sample sacks and tool sacks; canvas leggings, aprons, and vent tube fittings. Last year 36 miles of vent tubing was made. In the past 20 years an average of 24.83 miles was made each year. Vent tubing is kept in good repair underground, but in cases where mines close down, tubing is returned to the plant and reconditioned there.

Air and water hose used for underground machines are made up in 40-50 ft lengths complete with couplings. Damaged hose is returned to the shop and repaired by splicing with pipe nipples and wire clamps, and damaged couplings are repaired or replaced.

Salvage Warehouse

A salvage warehouse is located in the old Anaconda mine dry. A crew of men is employed salvaging tools, metals, cables, etc. Most of the salvaged goods are used in other departments. Cast iron, aluminum, bronze and brass are sent to the foundry at Anaconda and wrought iron and steel is used in the copper precipitation tanks in the Great Falls refining operations. Old hoisting cable is sold to the company's lumber department at Bonner, Mont., and to dredging and fishing companies.

Oil Reclaiming

An oil reclaiming plant is equipped to reclaim used wiping rags, filter cloths, used lubricating oil, and to recondition transformer oil. Mechanical equipment includes a washer and dryer for reclaiming rags, oil heaters and a centrifuge and filter press for reclaiming and reconditioning oil. Reclaimed oil is blended with rapeseed oil and is then sent to the mines for use in rock drills. This equipment is

maintained by men from the main shops.

Columbia Gardens

Situated about three miles east of the center of town in a canyon of the main range of the Rocky Mountains and overlooking Summit Valley is a beautiful garden spot, picnic, and recreation grounds acquired from the W. A. Clark interests in 1928. Mechanical equipment includes a roller coaster, merry-go-round, airplane ride and miscellaneous playground apparatus. Seasonal dismantling, checking, repairing, repainting and reassembling are done by crews from the Butte shops.

Hoisting Plants

By far the greatest amount of time and attention is given to inspection and maintenance of hoisting equipment. Because of heavy and moving ground, Butte shafts, though not of the same size, are relatively small in cross section. This, coupled with their great depth, necessitates that hoisting be done at as high a speed as feasible.

air hoists using flat cable and reels; all other hoists use single or double drums and round cable.

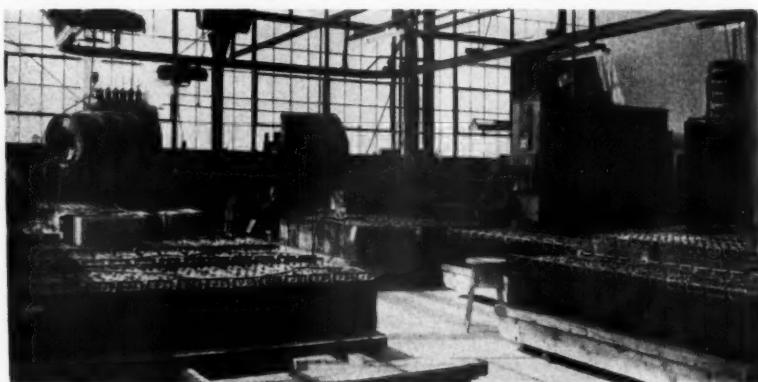
Hoists

All hoists are inspected daily by the mine machinist and by the master mechanics. Detailed reports of the inspection are made out in triplicate, signed by the inspector and sent to the office of the mechanical superintendent.

Two electricians and a boss are employed full time in a regular schedule of maintenance of electric hoists and in a three-month schedule, when a thorough check and cleaning is given each unit. One machinist is employed in a full-time task of checking and adjusting all Lilly safety controls used on hoisting engines.

Sheaves, Idlers, and Cables

The inspection and lubrication of all sheaves and idlers, as well as the inspection and lubrication of all surface ventilation fans, requires the full time of an experienced inspector. Sheaves and idlers at all operating



Battery maintenance section of electric shop

Most Butte shafts have two main hoisting compartments and one auxiliary hoisting compartment. The main hoisting compartments are served by electric, air, or steam hoists rated up to 2500 hp; auxiliary hoisting compartments are served by electric or air hoists rated up to 1800 hp, with 1500 hp predominating. Lowering and hoisting the shift is done by changing over the skips to four-deck man cages carrying 32 men per trip.

There are 10 first-motion d-c and 8 geared a-c electric hoists in operation in the Butte area and, unique in mine hoisting, there are 27 first-motion and 9 second-motion compressed air actuated hoists. One first-motion steam hoist of the reel type, built in 1893, is the sole survivor of the steamers. It is still going strong, hoisting 1000 tons of ore per day from the Emma mine, four blocks from the center of town. In addition to the steam hoist there are two compressed

mines are inspected and lubricated daily; at the non-operating mines the operation is done every other day. There are 97 sheave wheels and 27 idler wheels at the surface plants and 8 sheaves at underground plants. The sheaves underground are inspected and lubricated once per month, on Sundays. Spare sheaves and idlers are cataloged and stored at the East Grey Rock mine yard and are readily available for replacing broken or worn wheels.

Cables

Hoisting cables are inspected weekly or oftener as conditions require. Any round cables that show excessive wear due to cross-over are cut off at the drum end and reanchored so that the wear points will lie between the cross-over section. Cage ends which eventually become weakened due to cable twist are also cut off and re-clamped at regular intervals.

Flat cables that show worn sewing wire are taken out of service and reconditioned by discarding the two outside strands, inserting two new inner strands and resewing with soft steel wire. Any strands which show wear are also replaced. Hot application of pine tar and cable dressing applied to cables weekly, and in some cases oftener, reduces wear and prevents corrosive water from reaching the inner strands. A complete record is kept of all cables including date put in service, changes made, date lubricated, etc.

Cages and Skips

There are 202 main man decks, 89 auxiliary decks, 57 main skip decks, 10 auxiliary skip decks, 12 special decks and 57 skips required in the Butte operations. A complete card record of each unit of this equipment, including date in and out of service, description of damage in case of wreck and details of repairs and reconditioning is kept in the mechanical engineering department office. A fixed schedule of maintenance is followed and as indicator flag on the file card

are made between hoisting periods, while skips are hanging from the change-over rig. Major repairs and reconditioning are done at the High Ore mine boiler shop.

Shaft Guides

Because of the hazards attendant upon high-speed hoisting through shafts that have been misaligned due to moving and heavy ground, care must be exercised continually to insure that guides are properly positioned and fastened securely, and that there is no binding between guides and shoes. Prior to hoisting or lowering a shaft, the man decks are run through the shaft empty to make sure that running conditions are safe. On the graveyard shift, at the operating mines, shaftmen make a careful inspection of the shaft and guides and also make any necessary minor repairs. On Sundays, major shaft and guide repairs are made.

Due to the difficulty of obtaining clear fir for shaft guides and in order to obtain a stronger and more uniform guide and to minimize splintering, laminated guides of select Montana

the whole machine to swing freely in the plane of the guides. Affixed to the frame of the machine are two semi-pneumatic wheels, one, through suitable gearing and an over-running clutch, driving the paper record roll, the other mounted on spring-loaded, and guided struts, moving in and out with respect to the machine proper. Mounted on these struts is a bracket which carries a pen which engages the paper on the roll and thus records the movements of the tracing wheel as the cage is lowered down the shaft. In operation the cage is lowered at about 400 fpm for the full depth of the shaft to be checked. The hoisting engineer then stops the cage, and hoists at about the same speed. On the return trip, the pen is automatically retracted and the recording drum remains stationary. When the cage reaches the surface, the paper record is removed from the roll and the machine from the cage. For a 4000-ft shaft a complete record of the guide gauge condition can be obtained in about half an hour, including attachment of the machine to, and removal from, the cage. The record drum is so geared that the vertical scale is approximately 50 ft to the inch, and the horizontal is full scale. Thus any deviation from the true gauge of the guides can be measured directly in inches and the approximate location of the deviation can be obtained by scaling from the starting point or shaft collar.

Tramming Equipment

All underground tramming is done by storage-battery locomotive. In most instances 52-57-cu ft capacity, Granby-type, automatic dump cars are used. Surface tramming, from skip dumps to ore bins, is done by trolley tram cars. Present equipment includes 198 storage-battery locomotives rated at 5½ tons, 9 to 4 tons, 1 at 2½ tons, plus 52 Mancha locomotives rated at 1½ tons and 21 trolley tram cars.

Storage-battery locomotives are charged during the graveyard shift and since this is the off-peak power period there is no cost for the energy used; power settlement is made on a peak basis only. Distilled water is added to the batteries twice a week and, at the same time, controllers are checked, the mechanism is lubricated, and brakes are adjusted.

All minor repairs are made underground including replacement of driving units consisting of motor, gears, two wheels, and an axle. The large locomotives average 2½ to 3 years underground and the Manchas 2 years before they are brought to the surface for complete overhaul. Corrosive mine water and excessive operating temperatures contribute to maintenance requirements of locomotives.

For many years it was customary to construct underground track curves

(Continued on page 70)



Blacksmith shop handles construction and repairs

shows when each unit is due for replacement. Following is the schedule of operating periods allowed before taking a unit out of service for overhauling and annealing.

Skip Cages—Operating Mines. 8 mos. Skip Cages—Non-Operating. 12 mos. Man Cages—Heavy Service. 12 mos. Man Cages—Light Service. 18 mos.

A daily inspection of all cages is made by the blacksmith at the larger mines and at the smaller mines by a blacksmith from the central blacksmith shop. A detailed inspection report is made out in triplicate, signed and sent to the mechanical superintendent. Minor repairs are made by blacksmiths who work on the cage repair platform.

Skip and skip dumps are inspected by boilermakers twice each week and at the time of inspection, dumping mechanisms are lubricated and serviced. Replacements and minor repairs

larch are now fabricated at the company's lumber mill in Bonner, Mont. These guides are used for replacing damaged or worn out guides. When the new type of guide is installed, an envelope is attached to the back of the guide and in it is kept a complete record of service and performance so that comparison can be made with solid guides which are normally used.

In order to obtain a permanent record of the gauge between guides and also to make a quick and accurate check of the gauge, a guide-profiling machine was designed by the mechanical engineering department and built in the machine shop. This machine is made so that it hangs from the bottom crosshead of a cage, and, through suitable mechanism, a record of the true distance between guides is made on a paper roll as the cage is lowered down the shaft.

The links, from which the machine is suspended beneath the cage, allow

The Communist Menace in Labor Unions

Smelter Union Reaps Harvest Sown by Its Leaders

By ROBERT E. VIVIAN
Associate Editor
American Metal Market

THE talk, at lunch, turned naturally and smoothly to the current political scene. From there it went without effort to the welfare state, and from there to the events that recently had taken place in the vast dome-shaped amphitheater of Cleveland's Municipal Auditorium.

The historic 11th CIO constitutional convention will go down in American labor history as a memorable occasion because it was here that the CIO decided it must part company with Communists who had exploited American working men and women to a shocking degree.

Less than 1000 delegates took part in the great drama that was enacted in the echoing emptiness of this Cleveland hall, but they were duplicating actions similar to those that had been taken by labor movements in France and Italy and, to a lesser degree, in Britain and other countries. At long last, the battle against the international Communist conspiracy had been joined upon another front.

This decided break, however, cannot fail to have short-term consequences for companies who have to deal with these condemned unions in the course of their day-to-day business.

The legal situation resulting from the CIO's decision to expel Communist-dominated unions will probably be complicated, and the unions thrust out will certainly use every trick their attorneys can devise to maintain jurisdiction at as many plants as possible. Moreover, the bitter inter-union raiding tactics now being scheduled bid fair to try the patience of management to a point where industry will realize that it, too, must pay a price for the unslaving of its workers from those who have exploited them.

Communists Dominate IUMMSW

The nonferrous metals industry, of course, will watch the official CIO in-

vestigation of the International Union of Mine, Mill and Smelter Workers with intense interest. That investigation may well be a formal prelude to expulsion of this union, but it would be naive to think that when excommunication comes the industry will be free from harassment by the Communists who have dominated the union for so long.

The committee appointed by the CIO to conduct the investigation will be under the chairmanship of Jacob S. Potofsky, with Emil Mazey and Joseph Curran assisting.

For Mr. Potofsky, the assignment cannot fail to be a case of history repeating itself since he was a member of similar board that in 1947 investigated the smelter union over the same issue. The group, in an official report on its probe, found that the present secretary-treasurer of the union, Maurice Travis, was in continuous negotiation with representatives of the Communist party, but beyond stating the obvious fact that Communists dominated the smelter union and controlled its policies, nothing much happened as a consequence of this investigation. Mr. Travis and Reid Robinson, who also was condemned in the report, still are in power and Communists still dominate the union and control its policies.

Nevertheless, since the CIO has decided upon its historic break, this report constitutes quite an important part of the record. In 1947 the right and left wings of the smelter union were locked in memorable battle, and the uproar became such that the executive board of the CIO named the committee in an effort to prevent further turmoil. The report, issued after verbal and written evidence had been taken from both sides, found in part as follows:

"The committee was furnished with photostatic copies of letters which proved beyond question of doubt that Maurice Travis was continuously dealing with representatives of the Communist party in shaping the policy of

the International Union of Mine, Mill and Smelter Workers. These letters show beyond question of doubt that representatives of the International Union of Mine, Mill and Smelter Workers were busy not only in attempting to organize the members of the union, but any others they could, into the Communist party.

"The committee also finds that field men who had been discharged from other CIO unions for attempting to organize workers in the Communist party were hired by the International Union of Mine, Mill and Smelter Workers."

In the main, these conditions have not changed in the two years since this report was issued. Top officials of the smelter union, because their membership was steadily being lost, recently decided to sign the non-Communist affidavit required under the Taft-Hartley labor law, but at the same time they made it very plain that Communist domination was to continue and that basic policies were unchanged.

They intend still to deride the CIO report as malicious and untrue, persisting in their declaration that this verdict returned by a group representing labor, not management, was delivered with the sole purpose of destroying IUMMSW.

That this is true, may be seen in the recent address of the union's president, John Clark, at the nominating convention in Chicago. Mr. Clark, walking delicately over the truth, declares:

"Two years ago, a report scurrilously attacking this union was issued under the official sponsorship of the national CIO. That report was based on pure, double-distilled lies, concocted out of whole cloth by that well-known gang of union-busters, Messrs. Driscoll, Mankowski, Moyer and their pals. Some of these men have carried their true color into other national unions."

"This official CIO report, with all its viciousness, was used the following year by all the employers in all our negotiations. It was no accident. The report was intended to hand the employers a new weapon for union-busting.

"This lying document was a stab in the back of every member of this great organization. And—God pity them—it was even used by some weak

and reactionary elements within our own rank and file."

Clearly, Mr. Clark does not like this report and will now doubtless maintain that the CIO itself has again stabbed the smelter union, and all its members, in the back. He and his fellow officers have never been great ones for answering questions regarding their activities, preferring always to hurl the cry of "Red baiter" at those who have maintained that their operations constitute a disgrace to the American labor movement.

Unanswered Questions

Thirteen months ago, for example, the *American Metal Market* in an editorial asked 12 questions of Clark, Robinson and Travis.

The editorial containing these said that if the three officials were willing to reply, then their answers would be

(2) The committee appointed by Philip Murray, president of the CIO, found that Maurice Travis and other International officers had allowed the influence of the Communist party to interfere with the internal affairs of the International union. Will you explain in detail the extent of this interference and why Mr. Travis allowed it to take place?

(3) The CIO committee found that Maurice Travis was "continuously dealing" with representatives of the Communist party in shaping the policy of the International union. Will Mr. Travis explain his actions, and will he inform us whether he still is in negotiation with the Communist party? (Mr. Travis had not at that time disclosed his membership in the Communist party.)

(4) Why did officers of the International union attempt to organize

In 1947 it was shown that certain leaders of the International Union of Mine, Mill and Smelter Workers were continuously dealing with the Communist Party in shaping union policy. Since then, these same persons have signed the non-Communist affidavit required by the Taft-Hartley Act. Now another investigation of this union is being conducted by the CIO. Will history repeat itself?

published textually and without alteration. Moreover, the editorial said, "to make sure that rank and file members of IUMMSW get ample opportunity to study them, we will attach an introductory paragraph requesting employers to post the replies upon bulletin boards in every plant where the International union has bargaining rights."

Since Mr. Clark declared in the course of his address to the nominating convention that he challenges "any man" to point to a single falsehood in any one of the statements of the union's top officers, it is interesting to note that these questions still are valid today. Those who control the smelter union possess an undoubted talent for tampering with the truth, yet these questions might well be put to them by Mr. Potofsky when that gentleman's renewed investigation of the union gets underway.

The questions, to which the *American Metal Market* of course received no reply, were as follows:

(1) Will you state emphatically that neither you, nor any members of your executive board, have been members of the Communist party? Have any of your International representatives been members of the Communist party, and, if so, what is their present status in the party?

rank and file members into the Communist party? And why did the committee find that field men who had been discharged from other CIO unions for attempting to organize workers in the Communist party, were hired by the IUMMSW?

(5) The text of a letter from Phil Wilkes, organizer for the Communist party, to Henry Huff, an executive officer of the Communist party, has been published. This letter makes direct reference to a meeting Mr. Wilkes attended in Chicago "composed of our people within the Mine, Mill, and held prior to the Board meeting which is now in session." Why were such things allowed? Is there a similar group of Communists at work today?

(6) Wesley Madill recently resigned as Western vice-president of IUMMSW. It is recalled that at the time he was running for that office he said that he did not agree with certain of the administration's policies, although he saw eye to eye with them on most trade union questions. Did he resign because of the Communist issue?

(7) Did Ken Eckert, head of the casting division, resign in the row among International officials over Communist influence?

(8) Why did Willard Morris resign as counsel for district No. 2 in Utah and declare that IUMMSW had by

fair means or foul become the "helpless captive of an odorous foreign ideology, the Communist party"?

(9) When Robinson was president of IUMMSW, Charles Moyer was secretary-treasurer. Upon what grounds did Mr. Moyer testify to the CIO committee that he was unable to continue as an officer of an organization whose officers had requested him to issue untrue statements? Why did he declare that the loyalty of these officers was not to IUMMSW but to an outside group having "no connection with the trade union movement?" Why did he testify that these officers, in every dealing, acted under the guidance and instruction of the Communist party, and that their ties with that party were "self-evident"?

(10) Why was Reid Robinson deported from Canada on grounds that he sought to overthrow the Government?

(11) Why was George Knott, an International representative, deported from Canada? Also Rudy Hanson? Even the president of IUMMSW, John Clark, recently was prevented from entering Canada. You say that all these actions are the result of a plot against the International union, but Reid Robinson was deported after full hearings on the issue and after the verdict had been appealed to a high court in Canada. The courts, newspapers and company officials declare that Communists shape the affairs of the International union—what proof can you offer that all these are wrong?

(12) Thousands of rank and file members in many locals have seceded from the International union over the Communist issue. If all these people are wrong, why do you not issue a factual statement on conditions within IUMMSW? Why do you not meet factual charges with factual rebuttal?

Mr. Potofsky might well make reference to his original report on the union when he holds new hearings on its operations. He might well ask Mr. Clark why he now describes this document as "vicious" when a statement in the March 17th, 1947, issue of *The Union* welcomed the investigation and said that the smelter union would cooperate fully with Mr. Potofsky in the ascertainment of facts.

Maurice Travis, who was president of the smelter union at that time, declared in this statement:

"In presenting his recommendation for the establishment of a fact-finding committee, CIO President Philip Murray stressed the necessity for knowing all of the factors involved in the situation. Through the work of this committee, those facts can be ascertained.

"The committee and this principle are agreeable to this International Union, because we want the facts to be known to the CIO executive board,



An anti-red stand was taken by the CIO at its recent convention. Does this foreshadow expulsion of the IUMMSW?

the membership of the CIO, and the entire labor movement of the nation. We feel this to be necessary because of the many misrepresentations which have been made in this situation.

"The International Union will cooperate fully with this committee in its fact-finding efforts. If in the course of its functions the committee can make recommendations which will effect a solution to these problems we shall be grateful for its counsel."

Communist Control Recognized

The committee, as a result of its hearings, did indeed ascertain the facts, and the "entire labor movement" inevitably learned that Communists controlled the union. Similarly, organized labor today knows what many business executives long have known—that the Communist party and its representatives ride high, wide and handsome in the smelter union because those who have responsibility for the conduct of its affairs put up no opposition.

Despite his pious comments on the original board, Mr. Travis was not "grateful" for its counsel. When the board found that he himself was up to his ears in negotiations with Communists, it sought to end his betrayal by recommending that he step down and let the CIO appoint an administration to conduct the union's affairs.

But Mr. Travis, himself a Communist, had no intention of stepping down. He told the rank and file with typical humbug that the executive board felt it had no "authority" to thwart the "democratic" rule by

which the union was governed. Reid Robinson, it is worth noting, also once beat his breast in lamentation over the uproar within the union because of Communist domination. He was, he told a credulous rank and file, going to quit the presidential office and limit his responsibility in the smelter union's affairs merely to paying the cash dues demanded of every member.

In order not to upset prevailing conditions and policies, he thereupon named Mr. Travis president, and retired from the scene for a few weeks. Shortly afterwards, however, he was back in executive office and the merry-go-round continued as before.

It will be interesting to see whether Mr. Potofsky tries to reform the International union by recommendations in the report he will be making as a result of his new investigation. Only by expelling the smelter union from the CIO, afterwards grabbing its locals under a new charter, will he end the power so carefully preserved by Travis, Robinson and Clark.

Mr. Clark now says that the charges of Communist domination of the union in the original report are lies "out of the whole cloth," but he does not explain why Mr. Travis carefully hid from the rank and file the knowledge that he himself was a Communist during this critical period. Nor does he explain why the text of Mr. Potofsky's report was hidden from the rank and file, despite earlier statements that the smelter union welcomed the investigation. Phil Wilkes, an official of the Communist party, well knew what he was saying when he wrote to Mr. Travis that he was sure Mr.

Travis was the "proper candidate" for office. Henry Huff, another Communist party official, well knew what he was about when he wrote to Mr. Wilkes about Communists within the smelter union. They knew, and most Communists knew, that here they had willing allies.

About the Future

Last September, the writer made an address to the mining convention of the American Mining Congress when it met in Spokane, Wash. Many business executives at that time anxiously sought information upon what the future might hold, and this concern is probably even more enhanced today.

Current prospects, in view of the present situation, are not favorable for those who hope that the smelter union as now constituted will have a quiet and decent burial.

Those unions that are expelled from the CIO will use every trick in the book to make sure that the current contracts they hold are preserved. They will combine together—ideologically, if not actually—so that Communism in American labor will not perish. One has only to look at the words of Harry Bridges, president of the longshoremen's union at the CIO convention, to realize how things now stand:

"Let me tell the delegates here and let me, with all due respect, speak to the officers of National CIO. I am not afraid of the ILWU's ability to stand alone if need be. We'll get by, we'll get by! We recently took on the West Coast steamship owners and we beat them. Their organization was wrecked, not ours. We are still doing business at the same old stand with the same old people, and there is a new set of officers now in the Coast-Wide Steamship Association."

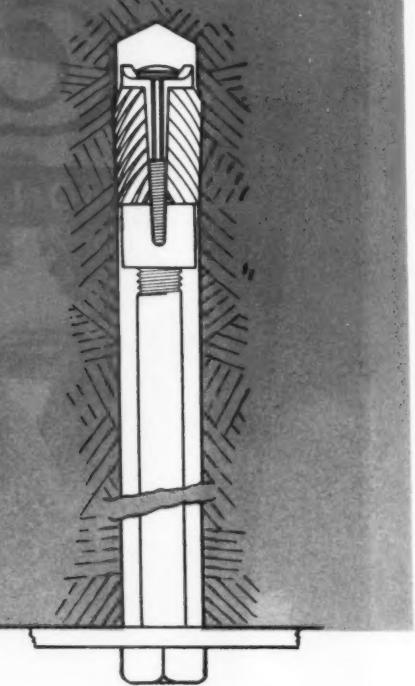
In the smelter union extensive preparations are being made for a long and stern struggle along the same lines. The more realistic of company negotiators will get ready for storms that cannot fail to come from this struggle for power.

The cost, however, to the nonferrous industry may be small if it means that workers are freed from the Communists who exploit them. No longer will American workers be used as small pawns in a world-wide political struggle, and no longer will companies have to deal with organizations subject to influence from abroad.

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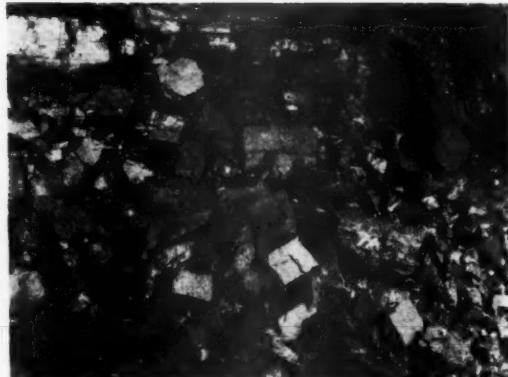
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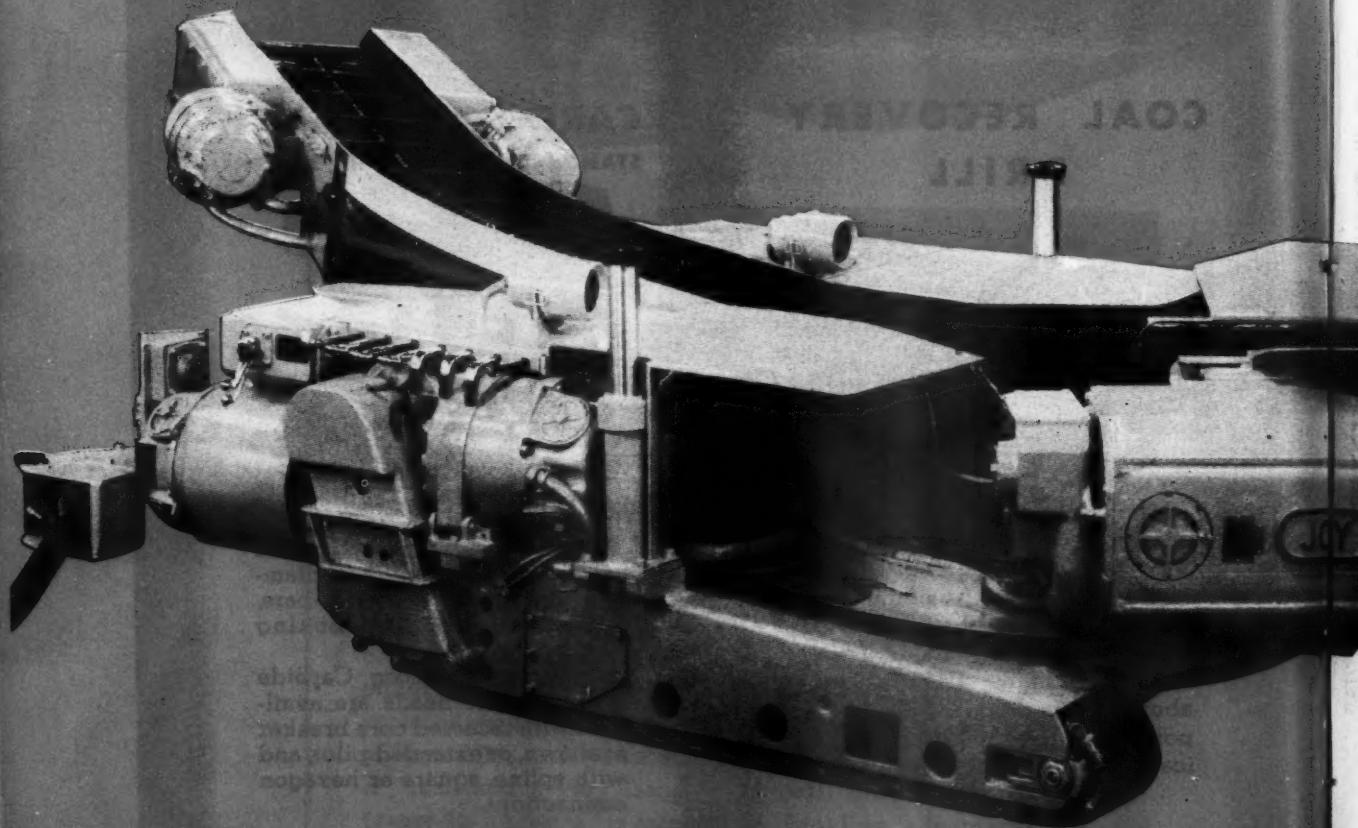
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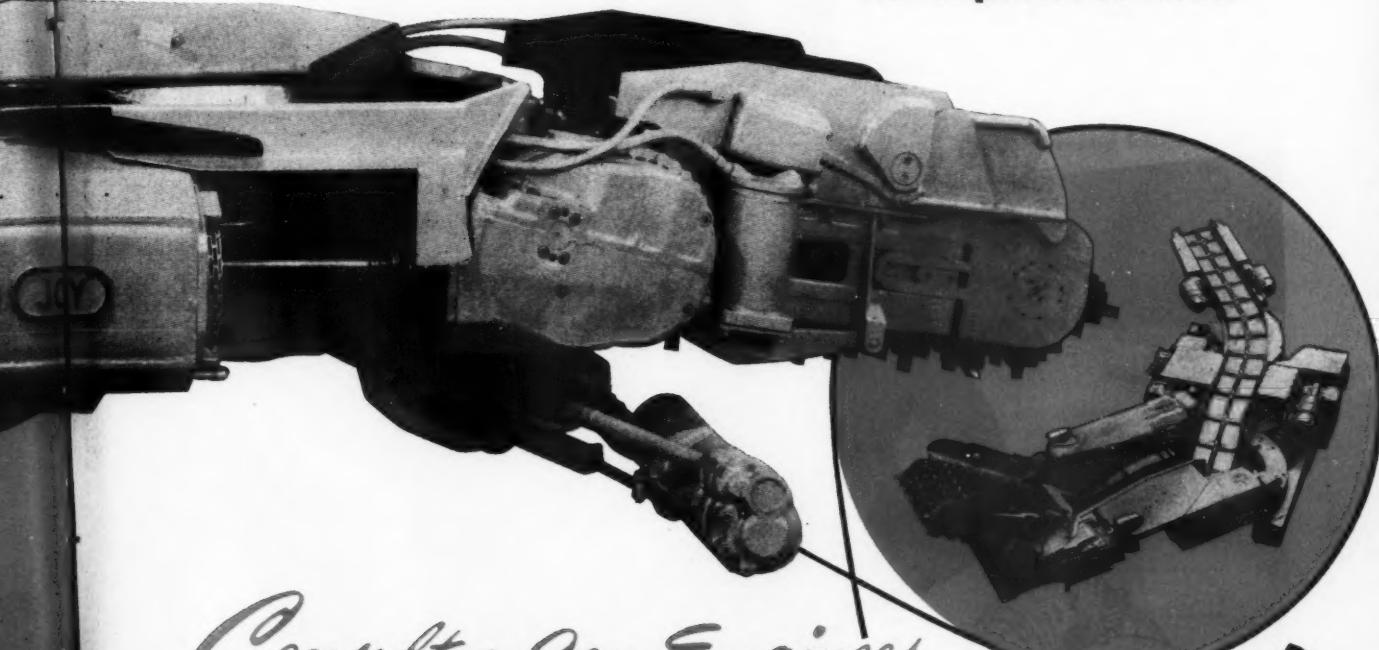


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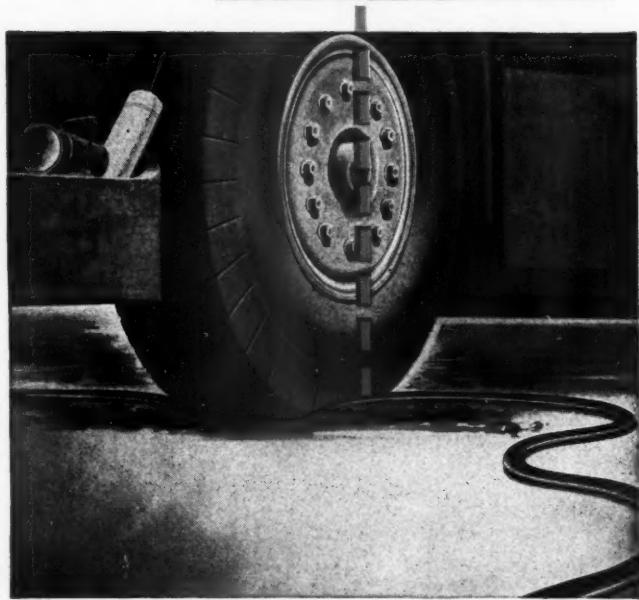
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Geologic Considerations of Roof Support



Spheroidal fracturing or exfoliation of sandstone roof

A Report of the Committee on Roof Action

By PAUL H. PRICE, Sub-committee Chairman

IT is recognized that coal is a sedimentary rock deposited under special conditions alternately with other types of sedimentary rocks which form the floors and roofs of present-day coal seams. These associated rocks vary in type from compacted muds to coarse sandstones. Some are well-bedded and evenly laminated, others are irregularly bedded as deposited, and some are essentially structureless. Irrespective of original condition of deposition, many of these beds are considerably altered in form, strength, tenacity and structure by post-depositional forces to which they have been subjected during the passing of great periods of time. Original peculiarities of deposition often play an important role in the reaction of the sediments to later pressure.

General Geologic Features

Most roof shales are dark and are considered to have been black muds rich in organic material when deposited. In some instances, recognizable plant remains are found to bear out the theory that such muds are gradational between the coal below and the inorganic light mud accumulations above. In fact, it is often difficult to draw the line between the top of the coal and the base of the shale. At the time of the deposition of these

shale-forming muds, which were probably originally in a very fluid state, there were occasional influxes of coarser sediments which are now in the form of sand lenses, channel fills and bars. Some of the lenses were probably deposited at the time of accumulation of laterally adjacent shales but others appear to have been stoped in between layers of the then unconsolidated muds. Other types of inclusions such as concretions, mud-balls, large fossils, etc., all have some effect on post-depositional alteration of the roof beds.

At the time of deposition of the roof shales or immediately following their accumulation, it appears that certain types of erosion surfaces developed which removed portions of these beds. It cannot always be shown that these erosion surfaces developed above water level and in many cases it is fairly certain that they are of subaqueous origin. Such surfaces may have a regular pattern which conforms to our ideas of the ordinary drainage system of a stream and other surfaces may show disconnected scour or channelling which at least in some cases could be attributed to either continental shelf or shore-line erosion features. In single exposures, such as can be seen in a mine or strip-pit, such features usually appear two-dimensionally as unconformable deposits on the roof shales. In many instances it can be seen that these deposits actually

fill channels which have cut completely through the roof shales and even through the coal and some of the underlying beds.

In connection with the development of erosion surfaces on some of the beds of rock above the coals, it is often found that uneven deposition and especially irregularity of the basal portions of subsequently-deposited beds has considerable deformational effect on the underlying rocks. It has been noted that the muds are probably deposited in a semi-fluid state and that considerable compression and consequent water loss is necessary before such muds can be compacted into consolidated rocks. It is likely that they compress less than the peat material which consolidates to form coal but there are various types of geologic evidence to show that they compress to as little as one-fifth their original thickness. During such compaction any less compressible bodies included within the bed such as sandstone lenses have a distortion effect on the shale itself. The mud tends to move laterally under pressure by flowing away from above and below the less-yielding inclusion. This results in distortion of the original bedding planes or laminae. The effects of such distortion are less serious than distortion after the beds have consolidated as far as coal mining is concerned. Prominent irregularities of the basal surface of sandy or silty overlying beds have the same general effects on the underlying shales as do the hard inclusions just discussed.

During the passage of geologic time, following the accumulation of coals and associated sediments, great

Dr. Price was assisted in the preparation of this report by his sub-committee: A. T. Cross, J. P. Nolting, and A. E. Spotti.

pressure comes to bear on the rocks. This affects them in various ways. The pressure may be due simply to mass and weight of overburden, i.e., overlying beds, or it may be due to stresses which develop in association with mountain-making movements of the earth's crust. Some of the common phenomena exhibiting deformation in ordinary exposures may be attributed to either general type of pressure, but often it is not possible to tell which was the principal force. If the pressure comes early enough after accumulation of the beds they may be deformed before final consolidation. Such pressure may hasten consolidation and thus alter the form of the mud from that which would occur without action of such pressure. If enough pressure is present to considerably raise the temperature, the deformation may result in a much more homogeneous mass than was evident in the original material.

Geologic Phenomena

In general, beds which have been reasonably consolidated before subjection to great earth pressures show some types of phenomena which are more or less well known. Most common of these are folding and faulting. Another feature which is relatively common in the roof shales is development of slickenside surfaces and shear-planes with slickensided contact faces. Such surfaces are commonly called "friction mirrors" by reason of their mirror-like polish. The grooves on such slickenside surfaces are indicative of the general direction of the movement. It is believed that such movement is very slight and possibly of unilateral oscillating nature.

The importance of such earth movements on previously consolidated rocks is notable for, in general, rocks so deformed lack the original adhesion between laminae and in addition lack continuity of originally continuous beds. The presence of resistant sand inclusions or similar bodies results in actual "squeezing" of the shale away from the vicinity of such a mass and its movement laterally, with consequent distortion of all parts of the bed. Thus some roof shales appear to be "kneaded" beneath irregularities in the more massive parts of the overlying sandstones and around sandstone or mudstone lenses.

There are a number of other geologic phenomena which have some bearing on the nature of the roof shales. If the roof beds are subjected to the action of percolating ground water for long periods of time they may lose certain constituents which may weaken them. This leaching process is fairly common and is of importance in coal mining where it is generally noted as "rotten" or "punky" shale. Such a bed has little lateral strength. Some roof beds have a high percentage of clay minerals which

have a tendency to swell disproportionately to the other shale components. Beds of this type usually slough off in thick layers or swell up and drop off in massive slabs. Little can be done about such beds unless they are tightly sealed to prevent absorption of moisture or/and oxidation of certain mineral components. Roof shales which have an abundance of fossil plants or which have concentrations of micaceous silts along the laminae have little adhesion between the beds.

The importance of a knowledge of some of these interacting geologic phenomena on mining operations has not been appreciated. An examination of the nature of the roof rocks by a properly trained geologist would result in more efficient control of roof problems in connection with any mining operation. It is expected that in many mines, two or three roof types might be found, each of which requires different treatment. By means of exploratory holes drilled occasionally at the face of the workings, a geologist could forecast faulted areas, slickensided zones, unusually weak bedding planes, lenses or inclusions in normal roof shales, and rotten places. In fact, it is altogether reasonable to believe that he could set up criteria for determining such features which could be understood and used by the regular foremen which would make it possible for them to recommend or order the proper type of roof control program as mining operations proceeded. In mines where but a single type of roof existed, be it good or bad, a general evaluation of the best means of roof control could be made by a geologist which could be applied by the engineers in subsequent operations.

Roof Characteristics of The Sewell Seam

The Sewell "B" (?) seam ranges from zero to about 4 ft 6 in. in thickness. Locally it appears to be thinned or cut out entirely in either of two ways: (1) By local pressure of the irregular overlying sandstone and (2) erosional removal following deposition and prior to subsequent accumulation of sediments. In the first instance the conditions have important bearing on roof character in that the intervening shales and occasional sandy shales have been considerably deformed by the uneven pressure of the irregular base of the overlying massive Guyandot (?) sandstone. Also in areas where these intervening shales include some masses of sandstone as sloping, interbedded layers or elongated rolls or lenses the shales are even more greatly distorted, slickensiding progressing to an advanced stage, so that there is essentially no adhesion of the various beds and laminae. The two principal forms of roof which are difficult to hold are the greatly slickensided and deformed

roof shales cut by innumerable shear fractures and the irregular large sandstone or sandy shale masses which occur between the coal and the main bed of sandstone above.

In the second instance, the overlying sandstone either forms an excellent roof or is so deeply cut into the coal as to make it uneconomical to work. When the roof is of sandstone it has been difficult to determine whether it is the base of the strong, massive Guyandot (?) sandstone, which needs but minimum support, or the weaker sandstone lenses and beds included in the intervening roof shales. The determination of which of these two sandstones is present above the coal is necessary as soon as it is exposed by mining in order that the second type can be supported before it falls. To be safe, all sandstones are being propped equally in newer sections of the mine, a procedure which is unnecessarily costly.

The presence of relatively non-compressible sandy masses in the shale, coupled with the uneven pressure action of basal irregularities in the main overlying sandstone has resulted in considerable slickensiding during the slipping and rolling movements of the shale and sandy-shale beds. The original bedding planes are partially or wholly destroyed (Fig. 1). Where present they are so smoothed as to no longer exhibit any adhesion to one another. Since these distorted shales extend both above and below the included sandstone masses, the sandstones often let go in their entirety along with the shales and sometimes break in great conchoidal fracture patterns.

In some places these same sandstone masses seem to swell and split off in large slabby layers. This is accompanied by a series of loud ripping sounds and follows after a few weeks (?) exposure. Subsequently the large cracks increase in dimension and ultimately the roof sags so low as to be difficult to work under as well as forming a mental hazard to miners. Ordinary propping does not seem to be sufficient. Beams sag and have to be propped in the middle.

In one room with a roof of this type where sagging was thought to have been arrested by a large number of props on each beam, a single channel iron was placed between each beam and secured to the roof by four bolts placed at an angle and anchored. After interspersing all beams with such supports, the props and beams were removed. Approximately five months have elapsed and there has been no detectable evidence of further sagging.

In several rooms and haulageways when this type of roof is believed to exist (although it has not been determined with certainty that the roof is not of the strong massive Guyandot sandstone in all cases) similar bolted

channel iron supports were put in before cracking and sagging commenced. Some massive spalling fracture did occur later but no measurable sagging has developed in several months.

Where similar suspension type support has been used on the slickensided shales there seems to be no failure. Here the same type of bolts is used mostly with channel irons, but some with simple 5 in. by 5 in. by $\frac{1}{2}$ in. flat bearing plates. The bolts reach the firm massive sandstone in some instances, but more often they merely extend at an angle of about 45 to 70 deg in to the shales or the sandstone masses in the shales (Fig. 1).

Some faulting has occurred and the problems caused are about the same as in either of the two foregoing cases. In one room a good example of slice-faulting or shingle-structure on a small scale was noted in the roof shales and its sandstone inclusions (Fig. 2). Slickensiding is very strongly developed, especially in the immediate vicinity of the larger sandstone masses. In the example observed, the face cuts obliquely across the axis of the folding and faulting which probably parallels the elongate sandstone lenses.

Summary and Recommendations

(1) A bolted (suspension) type roof support appears to hold both the slickensided roof shale and the swelling or

mineral or physical composition which could be utilized by comparing small samples from test borings in the roof of each room at far less cost than giving all rooms equal support.

Characteristics of the Pittsburgh Seam

The Pittsburgh coal seam has a variety of roof types both regionally and locally. In the Booth No. 6 mine of the Christopher Coal Co. (formerly River Seam mine) the beds overlying the coal are of two principal types. The first is a massive, strong, sandstone (U. Pittsburgh?) which lies directly on the coal and forms an excellent roof which requires little support. Its basal contact is very irregular conforming to the irregular surface which developed by stream erosion after the accumulation of the coal and

increase in thickness of the coal (from about 7 ft 6 in. to over 12 ft in areas laterally contiguous with the thickest sandstone accumulation or/and the most massive basal prominence), by visible, minor flexures and by some lithologic changes. The possibility must be considered that some special conditions existed and persisted locally before, during and after the accumulation of the vegetable debris of the coal and associated rock forming muds and sands which resulted in the irregular and thicker accumulations of coal as well as the shales and sandstones subsequently laid down. Detailed study of the area might prove one or the other. Such a problem is outside the scope of this report.

The second type of roof bed above the Pittsburgh coal in this mine is a series of shales, clay-shales and thin coals which are even to irregularly

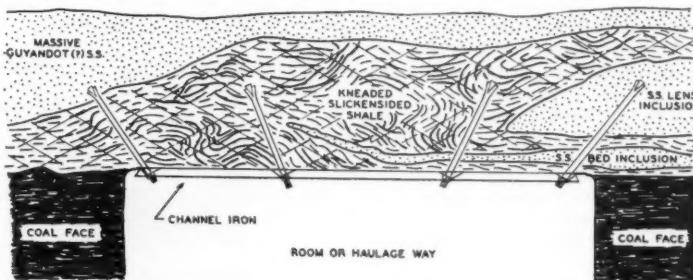


Fig. 1. Composite diagram showing bolting applied to variations of roof at Bergoo Mine

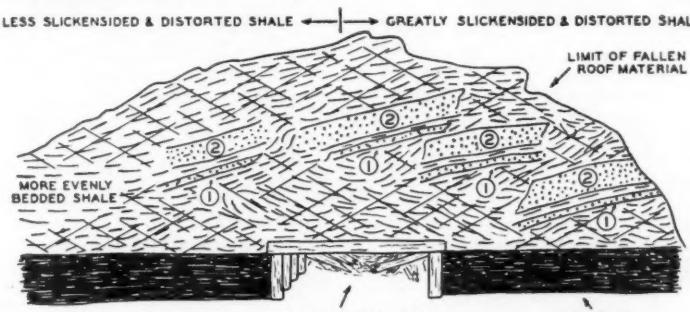


Fig. 2. A thick sandstone inclusion and some small slice-faulting has resulted in extreme development of slickensided fracture-shear planes. The sandstone inclusion feathers out into silty shale to the left

sagging type of sandstone roof as well or better than conventional propping methods.

(2) A real problem exists in finding a method of determining whether the sandstone in the roof is the strong sandstone body and needs little support, or whether it is a weaker or swelling sandstone and should be strongly supported immediately following exposure.

(3) It appears that angled bolting is probably more secure in these distorted roof shales than vertical.

(4) It is suggested that there must be satisfactory methods of determining difference between the two types of sandstone roofs on the basis of

some layers of shale above. In some places the sandstone which fills these old stream cut channels cuts out all the intervening shales and is in contact with the upper part of the coal bed itself; elsewhere it apparently lies in an old stream channel cut into the upper portion of the coal bed. In other places the coal appears to be deformed to a certain extent by uneven pressure of the thicker deposits and large basal irregularities of the sandstone.

It is often difficult to determine whether such alteration of the coal is due to deformation by pressure or defacement by erosion, but some evidence for the former is found in local

bedded. One layer of this shale called the "black rock," which usually occurs about 3-5 ft above the coal but may be nearly in contact with it locally, is fairly resistant and plays an important role in bolt-type of support to be discussed. Intercalated between this "black rock" and the main coal occur several beds of clay-shale ("draw slate") and thin (0-3 in.) or thick (4 in.-3 ft) coal streaks. These beds are weak, forming such a poor roof that the upper foot or so of the Pittsburgh coal (the "head coal") is left in for sealing the air from the shales above. It also probably furnishes strength in the form of rigidity.

Conventional types of support, i.e., timbering and propping from below, often yields and allows these overlying shales to fall. This may occur within a few minutes after removal of the coal, or the shale may take a month or more to weaken. It was noted that slickenside planes (irregularly intersecting diagonal shear planes with polished contact faces) usually are well developed in the places where bad roof falls have occurred. Some falls occur even after propping has been completed, usually several weeks or more afterward. The falls are often without warning. Since the upper part of the coal is left in place, the roof shales cannot normally be seen and no method is known or used at

present to determine the nature of the shales above the coal and the likelihood of special areas of weakness of the overlying beds. Roof falls have been most numerous at the intersections of rooms and headings. In such "slate" falls, the shales and included coal-streaks fall, exposing the "black rock." Sometimes such falls leave large, arched roof spaces which require expensive, special timbering and cribbing support.

Recently bolt-type suspension of the roof shales has been attempted along the lines advocated by the U. S. Bureau of Mines. The bolting has increased the security of the roofs at intersections and has reduced the number of such falls from two out of ten to about one in ten. The bolts are inserted vertically, pass completely through the roof coal, clay-shales and stray rider coals and penetrate the "black rock." The bolt anchor is intended to penetrate this relatively strong shale bed deeply enough to not pull out—i. e., 12 in. or more. Such bolting is considered to bind the beds together, thus affording additional strength. It is apparent from conditions observed in this mine that the most important roof strengthening factor is anchoring or bolting the weaker clay-shales and coal streaks to the firmer, more tenacious "black rock."

It has been noted that in some instances when the roof has been exposed long enough to have let down a little the tightening of the bolts draws the roof back to original position or at least raises it several inches. When there has been no sagging before bolting, no appreciable sagging appears to develop. Such recompression or drawing together of the beds would not result in a rebonding of the separated laminae, so the shale could not be considered to be as strong as it had been before sagging.

Observations were made to determine a cause for roof failure in bolted intersections. One thing noted is that a badly slickensided roof occurs in conjunction with most of these falls. This in turn is an important result of a special bedding phenomenon which occurs irregularly. This is an increase in amount of "draw slate" for a few inches to as much as 4 or 5 ft (Fig. 3). As a rule this local "roll" or expansion is an elongate body appearing as a lens in transverse section. A portion or all of the rider coal seems to feather out into this roll along one margin and possibly both. Part of all of the coal may continue across such a shale body, but if so it is usually thinned from 10-75 percent.

Geologically interpreted, this shale lens is either an accumulation of shale-forming muds in an available channel or scour line or else is formed post-depositionally as a squeeze of the uncompacted possibly semi-fluid muds by the weight of the accumulating

sediments above. Later as the beds become consolidated the shale rolls or thick shale bodies furnish irregularities which cause further compaction to be unevenly distributed. Slickensided fracture planes, distorted bedding and irregular hard and soft zones are some of the resultant phenomena which are most conspicuous in these areas as seen in exposures made by roof falls.

Roof Failure Causes

Several intersections were observed where bolting failed to hold the roof shales. The contributing factors appear to be:

(1) Too little roof coal left in, caused by cutter bar being allowed to angle upward when cutting the top. In a few places as little as 3 in. head coal was noted in proximity to several of these falls. Whether or not such thin places were common throughout all the mine was undetermined.

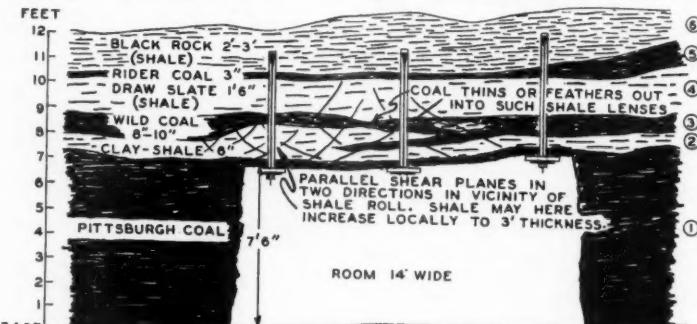


Fig. 3. Idealized section of Pittsburgh Seam. The "black rock" (No. 6) is the strong layer to which lower roof beds are bolted. Laterally the stray coal (No. 5) replaces a portion of the "black rock." The clay shale (No. 2) contains elongate lenses which break the continuity of the overlying coal. Shear planes and slickensided joints are developed and the roof has little strength

(2) Too few bolts. In intersections where only six bolts were used several falls were noted. The spacing may be too great. Only one fall was reported where nine or more bolts had been used (Fig. 4).

(3) Bolt anchors failed to penetrate "black rock" sufficiently. This seems to be the principal cause for failure of bolted roofs. In several instances, the bolt anchor pulled out leaving a flared or bell-shaped pit about 4-6 in. deep. Where falls occurred, apparently due to pulling out some of the bolt anchors, other bolts which penetrated more deeply were still in place after the fall, the rock having broken away from around them. In the one instance where nine bolts failed to hold the roof at an intersection, several of the bolt anchors penetrated only 2-3 in. This may be in part due to a human factor, not of misjudgment, but of shrinking from the hard task of drilling the "black rock."

(4) The proximity to a large roll or lens of shale. In such instance the shale is considerably slickensided and sheared and distorted and this condition is the principal contributing factor to the fall. In the case of such

a broken shale area channel irons connecting the lower ends of three or four bolts would probably have prevented the fall.

(5) Hole for bolt drilled too large. This probably resulted in failure of one or more intersections. In this connection it should be stressed that the expansion shell needs to fit firmly and evenly in the upper end of the hole. Distribution of load on the anchor is required.

Summary

(1) Nine bolts or more should be used in each intersection.

(2) The bolts should penetrate the "black rock" at least 12 in. They should be inserted so that the expansion plugs anchor the several bolts at different levels. When all at one level, a plane of weakness develops.

(3) It is suggested that a simple exploratory hole penetrating the roof rock would indicate the presence of

areas of distorted beds (at least it would disclose noticeably increased thickness of the shale between roof and rider coals) and thus, extra bolting, channel irons and similar protective measure could be applied.

(4) Bolts should be placed as soon as possible to prevent separation of the shale along the laminae. Roof shales already showing signs of sagging by the time they are bolted should receive considerable extra support at the beginning.

(5) Wood blocks should not be used as a cushion between roof and bearing-plate.

(6) Bolts should be vertical if anchored in the "black rock" but angled if they are not long enough to reach it, especially in slickensided areas.

(7) Where great increase in thickness to "black rock" is noted it might be assumed that a lens of shale is in the vicinity and the intervening shales are slickensided and jointed, thus extra bolts and channel irons would be advisable.

(8) Top cut should not be closer than 10 in. to top of coal.

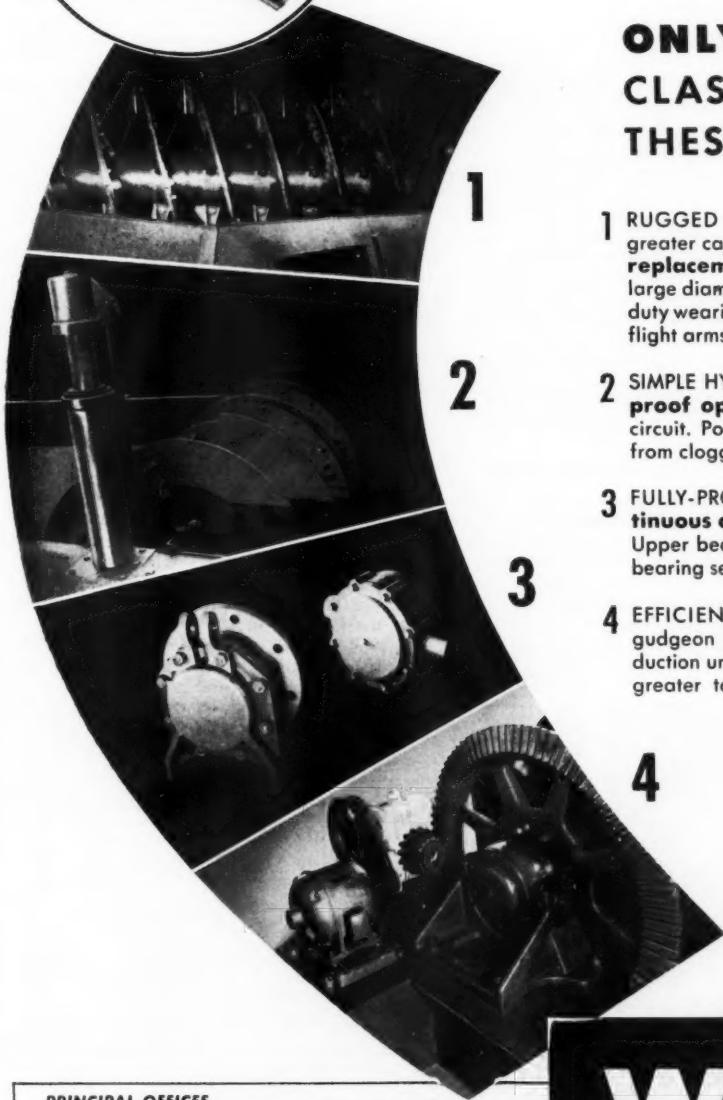
(9) Sound the top of the hole to be sure it sounds solid.



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How Bunker Hill Cut Drilling Costs

Single-Pass Bit Adopted for Development Headings and Ore Breaking



By ROY S. HOOPER

Assistant Mine Superintendent
Bunker Hill & Sullivan Mining
& Concentrating Co.

IN 1938 Bunker Hill began to change from conventional steel to detachable bits. After trying two kinds, over a period of about two years, the Ingersoll-Rand "Jack Bit" was finally adopted as standard, and all drilling operations were converted to this bit by 1941.

These bits were used almost universally throughout the mine during the war years. After the cessation of hostilities, however, the labor turnover became very high. It was impossible to keep a nipper on the job long enough to train him to give the proper care and attention to detachable bits that is required if losses are to be kept to a minimum. With this condition prevailing, losses of bits became excessive. More new bits were required and costs increased to the point where the mine management began to consider seriously the various new bits that were appearing on the scene.

Among the new types considered was the Throwaway bit, then being developed by the Throwaway Bit Corp. of Portland, Ore. The design of this bit and its attachment to the drill rod was so simple that, at first glance, it seemed preposterous to expect the bit to stick on the rod while drilling or while being removed from the hole. But this same simplicity and the strong cross-section of the bit end of the rod have proven to be points of superiority over other methods of attachment.

Tests were begun at the Bunker Hill

Mine in the spring of 1948 while the bit was still more or less in the experimental stage. The usual "bugs" and troubles were encountered as is always the case with a new product. However, the basic design appealed to the mine management so that tests were continued on a small scale. As the manufacturer continually overcame difficulties and improved the product, the results obtained were so encouraging that the bits are now going into service in the stoping operations. It is expected that within the near future the major part of all drilling in the Bunker Hill Mine will be done with the Throwaway bit.

Bit Design Data

The bit is of four-wing design with the ends of the wings undercut so that the wearing surface increases very little as gauge is lost in drilling. The socket is straight with no taper or eccentric effect and the end of the rod is ground or machined to 1 in. plus or minus .001 of an inch, with parallel sides and only a slight bevel on the

skirt seems to be a large factor in holding the bit on the end of the rod and bits are rarely lost in holes, even in ravelly ground where rods are pulled with automatic feed machines.

Before using this new bit, drill rods were made up of 1 1/4-in. round, hollow carbon steel, but with the smaller bit diameters now used the steel has been changed to 1 1/8-in. alloy steel, supplied by the Crucible Steel Co. and trademarked "Park Alloy."

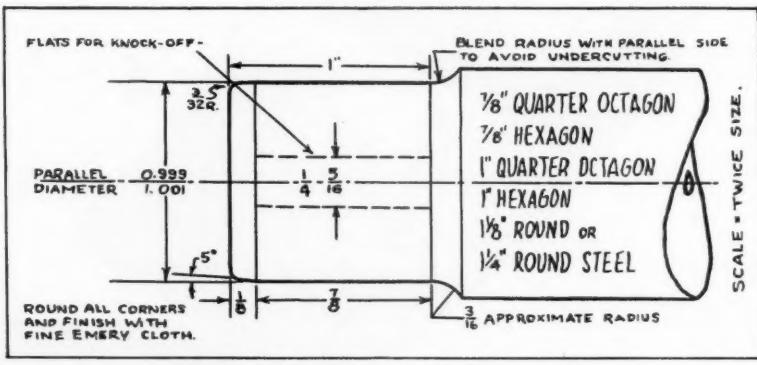
It is interesting to note that, although shank ends on this steel are heat-treated according to alloy steel practice, no treatment of any kind is used on the bit end of the rod. So far, in drilling many thousands of feet of hole, not one bit end of the rods has been broken off in service. No definite engineering records have been kept of rod life but the consensus of opinion of the miners, the bosses and the steel shop foreman is that rod life has been at least doubled.

The combination of the new type bit and smaller section alloy drill rods has been accepted by the miners and they now prefer this equipment to that previously used. This fact is pleasing to the management for the approval of the men is a necessary factor in introducing any new equipment or method.

Carbide Bits Speed Shaft Sinking

Bunker Hill has recently completed sinking 1100 ft of inclined shaft. Tungsten carbide bits of 1 1/2-in. diam were used throughout the sinking period and records were kept of their performance. Only new bits were used in the shaft.

Both rods and bits were checked at the beginning of each drilling shift.



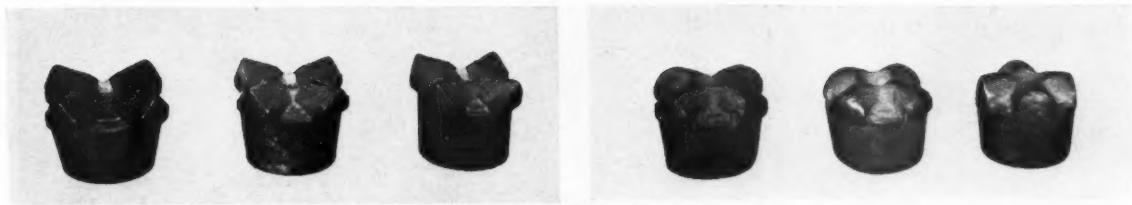
Details of rod ends for use with Throwaway bits

end to facilitate starting the bit on the rod.

Heat treatment of the bit is closely controlled and bits are uniform in the hardness of both working face and skirt. Induction heating of the bit face is so rapid that quenching and hardening can be accomplished while the skirt remains soft. Cutting edges of the bits average 64 Rockwell "C" and skirts 25 Rockwell "C." The soft

bits requiring grinding were removed and new ones supplied, and rods with loose or broken inserts were sent to the steel shop for reconditioning. Bits were never returned to the shaft after grinding but were used in drifts or cross-cuts with credit given to the shaft for their remaining life, which averaged 30 percent of the original footage drilled.

Although the cost per foot of hole



New and used Throwaway bits

drilled with tungsten carbide bits was high in comparison to other drilling costs in the mine, it was worth while from the point of speed and freedom from trouble, and the sinking time was materially reduced.

Also, in fairness to the tungsten carbide bit, it should be pointed out that the rock drilled in the auxiliary shaft was harder and more abrasive than the average of the mine. Gauge loss was so great that bits averaged only 115 ft in the shaft, and 34½ ft after grinding; a total of 149½ ft for the life of a bit.

Advantages Influencing Bit Adoption

Performance and costs of the detachable bits and of the Throwaway bits are listed. Other advantages of the Throwaway bit are numerous. Owing to the smaller diameter of the starter bits, the drilling speed has been materially increased. It varies from 15 to 25 percent, according to the rock being drilled. Explosives are saved because of the smaller bore of the finished hole, and drilling time is reduced further because of the fewer bit changes to be made. Throwaway bits are more easily removed from the

rod than are threaded types of bits. The method of removal is as follows: On the bit end of the rod, which has been machined to 1 in. diam, two flats are ground $\frac{1}{4}$ to $\frac{5}{16}$ in. wide and diametrically opposed to each other. To remove the bit from the rod, the soft skirt of the bit is hit directly over one of the flats by a sharp hammer blow. This springs the metal and partially breaks the contact of the bit and the end of the rod. A handy tool is then slipped over the rod directly behind the skirt of the bit and another blow of the hammer knocks the bit off.

Distinct advantages are offered by the Throwaway bit in a very large percentage of the drilling done in the Bunker Hill mine. The bit is espe-



Knock-off tool facilitates bit removal

quartz, and sometimes siderite, the results have also been excellent.

This bit is not considered to be the

	Feet drilled per bit use	Cost per bit	Cost per foot of hole drilled
Jack Bit.....	2.5	\$.1225 per use	8.055
Tungsten Carbide.....	149.5	\$12.00	8.08
Throwaway.....	12.4	\$.15	8.0121

cially suited to the medium hard, extremely abrasive quartzites that predominate in development headings. In the drilling in stopes, where the vein filling is composed of galena,

final answer to problems met in all types and kinds of drilling, and an open mind should be kept in considering anything that may appear on the market that will give better results.



Striking bit skirt over flats breaks contact



Bits are removed by a blow on knockoff tool



Representatives of all branches of coal mining gathered at the Annual Conference

Coal Division Committees Meet In Annual Conference

FOLLOWING through on its constructive work directed toward the solution of mine operating problems, the Coal Division of the American Mining Congress held its 15th Annual Conference on November 17 at the William Penn Hotel, Pittsburgh, Pa. A group of nearly 200 operators and manufacturers—committee members and others—gathered in the Allegheny Room to hear the reports and discussions highlighting current mining problems on which committee studies are being made.

This annual meeting brings the several committees together in an open forum where members may exchange ideas and correlate their studies so that final reports will contain comprehensive accounts of the latest and best practices that are being developed. The

committee members, representing producers and manufacturers, are specialists in their respective fields. Their reports, which are considered as authoritative by the industry, cover major phases of mine operation—surface preparation, mechanical loading, underground power, conveyor mining, roof action, haulage, safety and ventilation.

As presented to the Conference the reports were in preliminary form subject to later revision. Abstracts published here indicate the great amount of time and effort which the committee members are devoting to their studies of current coal mining problems. In completed form, the final reports of the committees will be published in *MINING CONGRESS JOURNAL*.

SURFACE PREPARATION

Committee Chairman
T. W. GUY

THE growing use of full-seam mining with mechanical loading and with the more recent continuous type machines, is greatly increasing the amount of rejects brought to the surface disposal piles; percentages of 30 percent and more are becoming quite common. The preparation plants are handling the resulting greater burdens, but major problems have been encountered in transporting the refuse from the mine or cleaning plant, in finding suitable space for storage, and in preventing fires in the waste dumps. To help in solving these problems, several committee studies are being made.

EXTINCTION AND PREVENTION OF GOB PILE FIRES

HENRY F. HEBLEY

THE demand for the elimination of burning gob piles is leading to a number of studies and experiments, both on extinguishing methods and fire preventive measures, by various agencies such as Mellon Institute, Penn State College, etc. The purpose of the sub-committee is to compile the findings of these agencies and also to report on various other independent investigations that are under way which cover the reasons for the oxidation, heating and ignition of mine refuse piles. A supplementary objective is to discover whether or not any useful by-product can be extracted from the refuse piles. These investigations have so far resulted in determining certain factors that have an influence on gob pile fires; the chemical composition of the material, the presence of moisture both in the air and in the material itself, the compactness of the piles and the influence of surface topography on the direction of air currents.

ANTHRACITE REFUSE BANK FIRES

E. T. POWELL

This report is based on available information on 34 bank fires either active or inactive in the Anthracite Field, where the average minimum height of the banks is 95 ft and the composition varies from breaker refuse, mine rock and ashes to combinations of these three materials. Further interesting data covers the causes of the fires:

Cause of Ignition	No. Fires
Unknown	12
Trespassers' or children's bonfires	8
Spontaneous	5
Hot boiler house ashes	3
Contractor salvaging material on bank	2
Oily waste and rubbish	1
Locomotive spark on old timber	1
Tool shanty fire	1
Brush fire	1
	34

Various methods for extinguishment were used. Water quenching was successful in two cases and unsuccessful in five; excavating was successful in seven cases and unsuccessful in three; trenching to isolate the fire was successful in five cases and unsuccessful in two; trenching and covering the fire area with clay was successful in two cases and unsuccessful in one case.

METHODS OF HANDLING REFUSE

W. R. CUTHBERT, Sub-committee Chairman
V. D. HANSON, G. N. PERKINS, L. J. VOGEL

METHODS of handling refuse from mine and preparation plant may be divided into several broad classifications: (a) single stage disposal—where the mine refuse is handled directly by the mine car to the slate dump; (b) two stage disposal—where mine rock or washery rejects are dumped into a truck, larry or aerial tram without intervening bin storage; (c) multi-stage disposal—includes many combinations of dump bins, storage bins and methods of transportation by belt conveyor, truck, larry or railroad car.

The report describes five typical installations. At mine "A" the mine cars dump into a rock bin from which the refuse is hauled away by truck. At mine "B" mine rock and washery rejects all go into a 90-ton steel bin from which a seven-ton monitor transports for a distance of 1400 ft, with a vertical rise of 400 ft to a hilltop truck bin of 50-ton capacity. Final disposal is by a six-ton truck to the dumping area. Mine "C" has two disposal systems; the mine slate is dumped into a bin which in turn discharges to an aerial tram. The cleaning plant rejects are loaded into mine cars and returned to the above-mentioned bin. Mine "D" dumps mine cars into an 8000 cu ft bin which feeds to a 1500-ft aerial tramway that transports up 300 ft to a 9000-cu ft transfer bin. From this bin another aerial tram takes the refuse to the dumping ground. Mine "E" produces approximately 5400 tons of raw coal daily, of which approximately one-third is refuse—mine rock and rejects from the washing plant. This material goes directly to railroad standard-gauge refuse cars which are hauled by steam locomotives to the disposal grounds. The topography is mountainous and the "hollows" are used for refuse disposal.

REFUSE DISPOSAL AT STRIP MINES

JAMES J. MERLE, Sub-committee Chairman
H. N. HICKS, J. L. DRESS, W. R. CALER, D. A. WEBER

THE disposal problem is somewhat easier in open-pit mining than in deep mines inasmuch as the abandoned pits offer a disposal ground. There is always plenty of non-combustible material in the overburden which can be utilized to seal the surface and edges of the refuse piles



S. M. CASSIDY, President, Consolidation Coal Co. (Ky.), as Chairman of the Coal Division, opened the Conference, complimenting the committees on their reports.

where such sealing is necessary. Also, truck haulage roads utilize a large quantity of refuse material. The reports describe methods used at seven operations: four in Illinois and three in Indiana, and include handling mine rock and washery rejects. The latter, in addition to the more or less conventional methods of truck haulage for the larger sizes, involves the disposal of slurry by hydraulic flushing to settling basins.

ROOF ACTION

Committee Chairman
FRANK G. SMITH

THE new practice of roof support by suspension rods is meeting with phenomenal success, but there have also been some failures. Because of its recent introduction to coal mining, there is not yet a sufficient background of experience to set up definite rules or formulae and the committee has felt that its first procedure should be to gather as much data as possible on actual operating results.

EFFECTS OF ROOF BOLTING ON OPERATING PRACTICES

G. N. McLELLAN

THIS type of roof support probably cannot be used universally in all mines, but where it is used and proves successful, the following effects on coal mine operating practices may be noted. It will reduce the accident rate resulting directly and indirectly from roof falls; the workers won't be subject to the hazard resulting from knocked-out posts and timber sets. In some instances, entries and rooms can be driven at greater widths; this will increase operating efficiency, inasmuch as the cutting, drilling, shooting and loading time per ton will be lowered. Mobile equipment will be able to operate at faster speeds and with greater safety; maneuverability will be increased. Shot-firers need not undershoot a cut of coal for fear of knocking out timber sets. Roof bolts will maintain a more uniform rib line and in some cases will make possible the slabbing of wide pillars, enabling machines to spend more time in the actual process of mining coal.

EQUIPMENT AND MATERIAL FOR ROOF BOLTING

G. O. TARLETON

TO take advantage of the increased tonnages made possible by roof bolting, equipment capable of drilling a hundred or more holes per shift is required, with subsequent operations of anchoring and tightening made as fast and as economical as possible. Some companies have pieced together equipment on hand to form a crude prototype of

the machine desired and two manufacturers now have machines of this general type ready for the market. Dust from the drill cuttings is a problem which will be corrected, probably by hollow augers spraying water up in the holes. Bolt anchors of the wedge or expansion type have proven successful. The characteristics of the roof strata determines what type of bearing plate is best; these now vary from small triangular "shin plasters" to short channels and in some cases full length crossbars used with anchor bolts.

ROOF BOLTING AT ROBENA MINE

EXPERIMENTS have been conducted over the past ten months and a complete record of each roof bolt has been kept, showing date of installation, roof strata, torque meter reading, condition of roof and whether installed on

	Per Foot of Heading	Per Set
<i>Channel Type</i>		
Material	\$2.14	\$8.56
Fabrication	0.44	1.76
Labor	0.88	3.52
Total	\$3.46	\$13.84
<i>Bearing-Plate Type</i>		
Material	\$1.62	\$6.48
Fabrication	0.34	1.36
Labor	0.66	2.64
Total	\$2.62	\$10.48

first, second or more cuts behind the face. An average erection time for one channel set is 45 minutes for two men, and 30 minutes for a bearing plate set. Costs of both types of installations are shown above.

ROOF BOLTING IN STEEPLY PITCHING MEASURES

D. E. INGERSOLL

EXPERIMENTAL roof bolting has been carried on in the development of a tunnel driven into measures dipping at an inclination of 70 to 85 deg. The measures are confused in spots with the result that the tunnel roof presents a ragged appearance and sounds "drummy" or insecure in some places. Upon testing, one month after installation, certain variances in torque meter readings, both plus and minus, were observed, but none were of sufficient magnitude to indicate any greater load on the bolt due to roof

action. There have been no falls of top, but scaling occurs which requires dressing between bolts and ribs. This scaling is at present attributed to shattering of adjacent strata by heavy tunnel firing, plus the action of ventilating current and change of temperature.

ROOF BOLTING WITH WOODEN PINS

STERLING S. LANIER, JR.

IN considering the use of roof bolts we decided to try wooden pins. Roof holes are drilled to a depth of 5 ft approximately 45 deg to the vertical with 3-in. bits; pins of oak are turned to a diameter to fit tightly in the hole. The bolts are 5 ft long bisected longitudinally about 15 in. from each end. A long thin wooden wedge is then put in the split and the pin is driven up; as the diameter of the pin is approximately the same as the minimum diameter of the drill hole, the action of the wedge exerts a strong pressure against the surrounding strata. Another wedge is driven in the lower end thus intensifying the tightening action. Patents have been applied for on the wooden pin and its method of use.

DETERMINATION OF GEOLOGIC FACTORS

PAUL H. PRICE, Sub-committee Chairman

A. T. CROSS, J. P. NOLTING, A. E. SPOTTI

THIS report is published in full beginning on page 45 of this issue.

HAULAGE ROADS

Committee Chairman

C. C. HAGENBUCH

IN view of the present high wage rates, a real service can be rendered to the coal industry by presenting methods that have been found successful in reducing the amount of labor used underground. Prefabricated track can be installed with a much lower man-hour expenditure than where the rails are cut and bent at the mine location. Welding the rail joints offers economies in labor and material as well as providing, without the use of bonding, an adequate return power circuit. Treated ties to serve for the life of the haulageway will eliminate expensive replacement and also will reduce wrecks and derailments.



A bad roof condition corrected by bolting



PREFABRICATED TRACK

J. R. ULRICH, J. B. HASKELL, J. N. CRICHTON

THE idea of prefabricated track is not new in coal mining as for some years there has been an almost universal adoption of manufactured turn-outs. To make the entire track system prefabricated would in effect mean adopting a few standard lengths of straight rail and curved rail and by using rails of multiple lengths, the system becomes flexible and rooms may be turned off at various intervals as desired. In June 1943 MINING CONGRESS JOURNAL published a Haulage Committee report "Construction Costs for Service Haulage Tracks," showing cost savings through the use of precast and precured rails used with standard manufactured turn-outs. A present day review of the 1943 report, using current costs for labor and material shows a saving of approximately ten percent in the track cost of a panel.

The foregoing deals principally with prefabricated track as applied to the working section of a mine. It is also well established that track for permanent locations may be prefabricated, and made ready to install, with a resultant saving to the coal company in time, labor and material. This may especially be the case where a complicated track arrangement is required, as for example in shaft and slope bottoms or anywhere that crossings or double crossovers are involved.

WELDING RAIL JOINTS

ARTHUR E. BELTON

RAIL welds,—electric, acetylene and the poured types—all have certain advantages and perhaps disadvantages, and the type of service, place of installation, material used, etc., are cost factors. As a preliminary report, cost figures on eight installations were submitted on track lengths of from 1000 ft to six miles; three had the poured weld, one used electric welding and four used acetylene welding. The report shows the actual costs for these welds, together with number of failures and the reasons for the failures but the committee states that the figures are not directly comparable between the mines, because of different conditions, different material, etc.

TREATED TIES IN MAIN HAULAGE ROADS

R. W. WATSON, J. M. BRAY

PRESENT high wage rates in the mining industry coupled with the necessity for uninterrupted movement of loaded and empty trips require main haulage track capable of withstanding heavy, high-speed traffic with a minimum of maintenance and repair. Such a main line haulage road should incorporate the use of treated ties, which not only eliminate the material and labor of replacements, but further reduce the hazard of wrecks and derailments.

	Treated Ties	Untreated Ties
Total wages—\$1.76 per hour.....	\$6,262	\$19,272
Treated Ties—2640 @ \$1.65.....	4,356	
Untreated Ties—13,200 @ .78c.....		10,296
Total Cost.....	\$10,618	\$29,568

In presenting data to indicate the labor factor involved in the use of treated vs. untreated mine ties, it is first assumed that an average underground life of treated ties is 20 years and untreated is four years. One mile of track requires 2640 ties, and for the untreated ties one mile for a 20-year life with five replacements would require a total of 13,200 ties. The report considers only the actual

handling of the ties, omitting road bed and rail, and estimates that for a 20-year haulage life, the use of treated ties would result in a saving of \$18,950 per mile of track.

MECHANICAL LOADING

Committee Chairman

J. F. MAZZA

FOR the purpose of the committee report, continuous mining is defined as "The application of one machine to perform, with a minimum of interruptions, the operations previously performed by a number of machines." Several machines now on the market potentially meet the definition, although it is recognized that at present there is actually no 100 percent continuous mining. Besides operating delays, other interruptions occur due to room length, panel limits, and property lines. These necessitate starting a new place or changing direction. Because of the fact that there must be considerable trial and experiment in the adoption of the new machines, the committee felt that a service to the industry could be rendered by making what might be termed "progress reports" as developments proceed.

MINE PROJECTION FOR CONTINUOUS MINING

M. H. FORESTER

THE expression "Continuous Mining" envisages a constantly moving stream of coal made up of variable size particles, between the solid coal face, where some type of continuous mining machine (or machines) extracts it from the seam, to a point at the surface of the mine, where either storage or a processing plant or a separate transport system takes over. After discussing the subject from a variety of angles, the committee is in agreement that the submittal of any specific plans, projections or recommendations looking toward the formulation of the same would be premature.

It was therefore felt that its function can best be fulfilled at the moment by a review of the basic considerations entering into the preparation of plans or projections for the development and exhaustion of a given area of coal, with the employment of a continuous-type mining machine or machines. Mine projection must take into consideration such factors as roof control, drainage, ventilation, transportation, supply and power, all of which are affected by the concentration of productive effort and operations in one place.

TRANSPORTATION FOR CONTINUOUS MINING

R. H. KNAPP

THE objective of this study is to compile a list of the various possible transportation systems in order that they may be studied comparatively to determine (1) their spheres of applicability, (2) the degree to which each of them measures up to the demands of "continuity" in operation in relation to the primary unit, or continuous miner, (3) their cost, (4) their faults and merits, and (5) special attributes not otherwise covered. The equipment for transportation known and in use today, together with all possible combinations of two or more types, include shuttle cars, combinations of shuttle cars and conventional type loaders, shaker conveyors; other possible combinations may include belts or chain flight conveyors serving in conjunction with shuttle cars.

To reach this objective, each of the following elements of the transportation systems must be defined and expanded to the fullest detail possible: (a) applicability to meet limitations imposed by natural conditions; (b) flexibility to adapt a particular system to variations in either natural or industrial limitations; (c) operational procedure and (d) cost—purchase price of equipment; operating expenses; maintenance and repair expenses.

ACCIDENT PREVENTION IN CONTINUOUS MINING

H. C. GOODHART

THIS new method of mining has introduced certain conditions not heretofore encountered, and from the limited experience thus far, certain factors have become evident. It is the purpose of this report to discuss some safety measures, but not, at this time, to recommend detailed safety procedure. However, it can be said in general that strict supervision is imperative, especially since roof conditions will always require close attention.

A rupture of an oil pressure line may cause a fire hazard and it appears that a fireproof hydraulic fluid is needed. Research is now under way for a solution to this problem, but in any case, fire extinguishing equipment and facilities should be readily available at all times. There is always a potential danger from blown-out cables and in any appreciable dust concentrations, dangers of an ignition are increased. A quick positive-acting circuit breaker should be installed on the cable at the power source. Cables should be suspended above the floor away from any possible dust concentration, whenever possible. The rapid advance introduces the hazard of gas accumulation; increased ventilation at the face has been accomplished by line brattices, and it is believed that existing regulations should be modified to permit the use of auxiliary ventilation equipment. Water spraying at the loading head should be employed at pressures of at least 200 psi by non-clogging nozzles that will produce a blanketing fog between the operator and the face. In addition, adequate rock dusting is essential, either by hand or preferably by a mechanical rock duster.

PERSONNEL TRAINING FOR CONTINUOUS MINING

W. B. JAMISON, Sub-committee Chairman
IVAN KINTER, HENRY THIES

A preliminary report has not yet been prepared, but progress on the study has indicated that it will be divided into four parts. The first will cover inspection classes as given by the Pennsylvania State College; this course would be similar to the one now being given where the students attend on their own time. The next possibility is a two-weeks' course on care and maintenance of mining equipment. Instructors are to be furnished by the manufacturers, but the cost of the instruction, as well as the wages for the attending employees, would be paid by the coal companies. A third method is a simple trade school such as now exists at the Valley Creek Mine in Clearfield, Pennsylvania; this is similar to the course just described and is company financed. A fourth method is being inaugurated by the Joy Manufacturing Company, setting up classrooms and courses in practical instruction in the operation and maintenance of continuous miners, mechanical loaders, and shuttle cars. These facilities will be offered to the personnel of coal companies.

ROOF SUPPORT FOR CONTINUOUS MINING

J. K. BERRY, Sub-committee Chairman
E. H. JOHNSON, H. A. JONES

ROOF support behind a continuous machine should have definite advantages in that the top is not disturbed by shooting and, in some cases, there is an arched rib which may have some supporting action. Furthermore, unlike

conventional mining, there is no tonnage disadvantage in driving narrow places. The machine operator of course must always be protected and it has been suggested that a light, strong canopy of tubular construction could be mounted on the machine for his protection. All the foregoing may well come in the future, but there are several problems today that need immediate solution.

Aluminum beams reduce the physical effort necessary and roof jacks are of value. Hydraulic jacks, incorporated as a part of the machines should be of assistance too. Where the machine leaves a notched rib, legs could be set in the clear, but where the machine is of the type that advances constantly and leaves a curved rib, some post setting difficulties arise. A possibility would be the use of a hitch drill, either post or machine mounted, to bore holes in the rib at the roof line, into which the ends of the bars could be inserted. Although roof bolting is fairly well established, there is still much to be learned as to what the maximum distance between bolts can be, or what is the correct depth. Cribs belong strictly to longwall mining, a method which offers inviting possibilities for continuous mining.

CONVEYOR MINING

Committee Chairman
A. E. LONG

IT is conceded by those who are experienced in belt operation that most belt failures and short belt life occur through misuse, improper installation or lack of proper maintenance. The committee feels that a real service can be rendered to the industry through a study on the general subject of belt care which, in addition to proper installation and alignment, includes correct operating procedure, especially as regards loading and alignment, maintenance, inspection, lubrication, and also proper handling and storage methods.

INSTALLATION AND MAINTENANCE OF BELT CONVEYORS

G. A. SCHNEE, Sub-committee Chairman
ROBERT FLETCHER, S. E. TAYLOR

THERE is much more to the installation of a belt conveyor than just the bolting or assembling of the unit. In the first place, considerable thought must be given to the mining plan, especially as it relates to the room lengths and the gathering haulage. Then of course the belt width, speeds, drives and so on, must all be carefully selected so as to meet the operating requirements. Another factor to be considered, particularly in the room and gathering units, is the ease of extending, dismantling, moving and resetting. There are two general methods; one is to have the production crew move the equipment, while the other is to have spare parts, particularly the drive and tail sections, that are set in advance by a special crew. There is some advantage in this latter method in that the men can be trained and proper moving equipment can be provided.

After a belt conveyor has been installed, its useful life depends upon correct operation, alignment and maintenance. Periodic lubrication and the use of the product recommended by the various oil companies for particular needs is important in prolonging the life of the drive motor, gearing, head and tail pulley bearings and the idler bearings. Too often the use of the wrong type of oil or grease results in bearing failures and excessive maintenance costs. Greater operating efficiency, longer belt life and lower costs result when belts are maintained by vulcanized repairs and splices. The double platen

method should be used when repairs other than the covers are made to the belt; this assures adequate and even vulcanization. Care, of course, must always be exercised in making such repairs. Excessive wear by the belt slipping on the drive pulley is overcome by a piece of the belt lagged on the pulley and grooved in a herringbone pattern. Lagging can also be purchased and is especially suitable where the bottom of the belt is usually wet. Spillage on the conveyor deck should be cleaned regularly to prevent an accumulation of material which would cut the underside of the belt.

STORAGE AND HANDLING CONVEYOR BELTS

C. W. THOMPSON, Sub-committee Chairman

THE proper storage and handling of conveyor belts will reduce belt mortality and will also reduce moving cost; improper storage and handling on the surface and underground results in deterioration of the fabric, carcass ruptures, gouges and edge wear. Specially-designed surface storage buildings should be constructed with provisions for controlling temperatures. Belt rolls should be upright. Original factory crates should be left on rolls until time of delivery to underground sections. Handling equipment should be used to move rolls to mine supply trucks. Fork trucks can handle such rolls by using a ram attachment which can be inserted through the center hole of the roll. Underground, if headroom permits, rolls should be stored in upright position with edges of layers having a plastic coating to exclude moisture from belt plies. However, if headroom doesn't permit storage in unright position, circular steel plates should be used to protect bottom side of belt roll; these plates should be larger than the belt rolls so that bottom edges of the roll can be sealed.

The use of a special transfer truck, as illustrated below, not only prevents belt damage, but also reduces the cost of handling. This truck, which is hauled by a rubber-tired tractor, consists of a circular steel plate with an upright spindle that winds the belt from the factory crate. It is then transported underground where it is unwound onto the conveyor frames.

METHODS OF BELT LOADING

J. W. HARDY

THE development of auxiliary equipment must keep pace with the major producing equipment to assure coordination and protection of all units. One such auxiliary device, which has been neglected, is a belt loading station to pro-

tect the conveyor and reduce delays of shuttle cars and mobile loading machines to the minimum. The tendency toward higher belt speeds for greater tonnage, rather than incurring an increased capital investment for wider conveyors, emphasizes the need of better loading stations than those now in general use.

This report attempts to compare the present methods of belt loading and suggests that a new type of feeder is needed to overcome some of the major disadvantages of present methods. The desirable features of a belt loading device are:

- (1) Adequate capacity to receive load
- (2) Ability to discharge within belt capacity
- (3) Ability to load onto the belt at near belt speed
- (4) Ability to center the load on the belt
- (5) Ability to prevent impact of loads on the belt
- (6) A high degree of portability
- (7) Ability to receive load over either side or end
- (8) Free from connections to conveyor framing
- (9) Mechanical simplicity and ruggedness
- (10) Compactness
- (11) Ability to pass lumps loaded at inby stations.

REVERSING CONVEYOR BELTS

H. W. MEADOR, Sub-committee Chairman

OVER 20 years of experience has resulted in convincing proof of the practicability and economy of reversing conveyors for transporting men and supplies. Reversal is practiced at the beginning of the shift when the men are taken into the working panels. Supplies are then loaded onto the moving mother belt. The three operators are at the belt transfer stations and have started their room conveyors reversing. The first man takes every third timber from the belt and places it on his room belt; the next man takes every other timber and does likewise and the third man takes off the remaining timber.

Entry and room belts are set to a true line with spuds spaced at 25 ft intervals. The minimum clearance of 24 in. is maintained from belt to roof. A profile of the heading is made; abrupt grade changes are eliminated by vertical curves with a minimum radius of 250 ft, blocking up the conveyor frames or taking bottom. The conveyor is leveled at right angles to the center line, and splices are carefully squared with a template. When the conveyor is set up in this manner, with idlers properly aligned for forward belt movement, no trouble is experienced in reversing.



Transferring belt from factory crate to special truck for underground handling



Ample clearance over belt insures safety

UNDERGROUND POWER

Committee Chairman
C. C. BALLARD

THE methods of supplying power to the working panels and the face machines is no longer an incidental phase of mining but has become one of the most important factors in modern mine operation. Recognizing this, other committees are requesting special power studies; a report on "Power for Track and Belt Haulage" has just been completed and two new studies are now underway—Belt Controls and Continuous Mining. In addition, the overall need for increased power efficiency at the working faces is being covered by a study on all a-c current underground.

POWER CONTROLS FOR BELT CONVEYORS

G. T. ATKINS, Sub-committee Chairman
P. M. BARLOW, W. F. ROBERTS, C. O. WOOD

SINCE the controls for single conveyors are already well standardized, it was decided to limit the scope of the report to the electrical control problems which arise when various combinations of tandem and cross conveyors are used. The report will cover both a-c and d-c control systems, divided into seven topics as follows:

Sequence control: control line method; speed actuated switch; power sequence

Remote control for starting, reversing, etc.: full voltage; reduced voltage

Belt slippage protection: speed actuated switch and time delay relay; speed actuated switch and interlocks on accelerated contactor

Emergency control—manual or automatic: push button stations; lever operated switch with pull rope; wire control; automatic safety control at transfer points

Preferential feeding or coal spillage protection: speed actuated switch; limit switch

Belt speed control: two-speed motors; resistor in series with armature; two-speed transmission.

Room conveyor control at the face.

POWER FOR CONTINUOUS MINING

R. M. HUNTER, Sub-committee Chairman
F. R. HUGUS, D. E. RENSHAW, W. F. ROBERTS, D. STOETZEL

THIS study is dealing with a subject that is relatively new and there is not a great deal of data available. Combined with this handicap is the fact that continuous mining has a wide range of requirements and its power supply must be gauged to meet these varying conditions. The report is designed to be quite comprehensive, as it is planned to include the complete system from the transmission line or source of power to the face machine and the first step will be to get as much information as possible on results of present operations.

A.C. POWER UNDERGROUND

J. O. CREE, Sub-committee Chairman
E. C. ANDERSON, C. C. CONWAY, C. R. HUFFMAN,
PHELAN McSHANE, OTIS STEWART

AT a recent meeting of the sub-committee it was stated that the purpose of the report will be to show the practicability of using A.C. power for all machines underground with the possible exception of main haulage locomotives. The increasing use of belt conveyors widens the field of application for the use of A.C. current, although there are, of course, some difficulties to be overcome. However, the operating advantages and lower power costs, particularly where voltages higher than 220 are permitted, are such that a report describing best practices will be of real value to the industry.

CABLE INSULATION

G. W. ACOCK, Sub-committee Chairman
E. W. DAVIS, E. G. STURDEVANT, T. R. WEICKEL

THE question of standardizing sizes, thicknesses and other specifications for cable insulation has been under way for some time by I.P.C.E.A. These recommendations will deal with cables as manufactured for general industrial uses, but in order to insure that they will conform to the requirements of mining service, the Power Sub-committee is collaborating in the study. It is expected that approved specifications will shortly be released. Later specifications are to cover flame resistance, and methods of making flame tests are now under consideration by the U. S. Bureau of Mines, the Pennsylvania Department of Mines, in cooperation with a number of cable manufacturers.



Conferees lunched together before proceeding with the afternoon program



Committee members plan an interest-packed 1950 Coal Convention

Program Committee Lays Groundwork For 27th Annual Coal Convention

CINCINNATI, Ohio and specifically the Netherland Plaza Hotel will be the site of the 1950 Annual Coal Convention of the American Mining Congress on April 24-26. To lay plans for this important conclave, representatives of the coal mining industry, including both operators and manufacturers, met at the William Penn Hotel, Pittsburgh, Pa., on November 16. There, in an all-day session, they outlined the subjects that will be covered in the comprehensive three-day meeting.

With so many new developments and improvements under way and in prospect the Program Committee had a real task to determine those phases of mining of the greatest importance for presentation to the large group that will convene in Cincinnati next spring. Subjects of interest to all fields and all branches of coal mining will be covered in general sessions. Special sessions will deal with particular phases of deep coal mining and stripping operations. Although many of the sessions will follow past procedure with two or three papers plus discussion, certain subjects are of such wide application that the views of a number of speakers will be required to develop the fullest information; in such cases, a symposium or "panel" will be arranged.

After thorough discussion of topics under consideration, the Program Committee concluded that the industry would be served best by covering surface preparation in two sessions, one dealing with methods of dewater-

ing and drying fine coal and another that will describe new cleaning processes that are being developed here and abroad, including methods of refuse disposal to prevent subsequent fires. Progress in continuous mining will be covered, with special attention given to auxiliary operations such as ventilation, power, transportation, etc. Roof bolting will be discussed from the viewpoint of reducing accidents due to roof falls and with the object of increasing the productivity of mechanical mining. The session on management problems will include an analysis of pension plans for supervisors, education and training to raise personnel standards, and public relations to bring about a better understanding of the industry's place in our national economy.

A session of special interest will take the form of a panel on safety, where all phases of accident prevention will be discussed. Other sessions will deal with power, maintenance, time studies, and underground transportation by belt and mine cars.

At luncheon meetings on Monday and Tuesday, nationally-known guest speakers will present their views on problems of wide interest to all. On Monday evening the annual Coal Miners Party will take place. This fine traditional function will bring the miners together in the congenial atmosphere of the Pavillon Caprice.

The annual banquet will be held on Wednesday evening. Departing from the practice of previous years,

the 1950 annual banquet will be of the "speechless" variety. Highgrade entertainment will keynote this top-notch social function.

The stream-lined method of advance registration, which worked so successfully for the 1949 Coal Show, will again be employed to simplify and speed up registration at the 1950 Convention. Notices will be sent to key officials of coal mining companies suggesting they send in lists of their men who will attend. Each representative will be furnished with his "Coal Convention Credentials," which upon presentation at Cincinnati will admit him without delay. Individuals not covered by these lists will, upon request, receive their "credentials" in advance. Eliminating the need for standing in line will make more time available for greeting old friends and making new ones as well as allow full time for convention activities.

At the opening of each convention session, one of the latest films of the U. S. Bureau of Mines on subjects of special interest to coal mining men will be shown.

A great deal of progress has already been accomplished by the Program Committee on the basis of the many suggestions made by mining men. The Committee will continue at work to carry out the details of the general program outlined in Pittsburgh. The coal mining industry may be assured of a program of maximum interest and value for the three days of the 27th Annual Coal Convention.

Real Estate Sub-Division—400 Feet Down!



Photographed in Southern Illinois coal fields by William Vandivert

Perhaps you've never thought of a coal mine as a piece of real estate. But a glance at the map of a mine hung in this foreman's office underground makes clear the geographical similarity between a city area and the mine workings. It shows in detail every "street," railroad and passageway—covering several square miles *under the earth's surface*.

To the eye of the mining engineer, a map like this translates itself into a bigger investment in property than many a desirable residential section. It marks the expenditure of millions of dollars for railroad track, conveyor belt, timbering, and elevator and ventilating shafts.

All of this planning, construction and equipment is designed to produce coal efficiently, economically and in quantity enough to meet any demands. All of it represents a carefully calculated program of engineering and investment—running into billions of dollars—which assures everyone of coal easy to buy, efficient and economical to use.

Aboveground, too, modern mines represent a far cry from the "pick and shovel" days. To produce "prescription coals," free from loose impurities and blended and treated to meet customers' specifications, mine operators have built million-dollar preparation plants. Among new preparation plants now under construction is one designed to wash and grade coal at a record rate of 2,000 tons an hour. Modern coal mines employ almost as many skilled "miners" aboveground as below—and *all* receive the highest hourly wages paid by any major American industry.

BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE

A DEPARTMENT OF NATIONAL COAL ASSOCIATION

WASHINGTON, D. C.

BITUMINOUS COAL... LIGHTS THE WAY... FUELS THE FIRES... POWERS THE PROGRESS OF AMERICA



Wheels of GOVERNMENT



As Viewed by A. W. DICKINSON of the American Mining Congress

EXCEPT for a few hearings which are proceeding at the Capitol on anti-trust law revision, employment trends, and economic problems, the majority of the members of Congress are in the home states and districts. A number of Congressional groups are touring in far lands, inquiring into the work of the Economic Cooperative Administration and our Government's administration of the Pacific islands.

The Joint Committee on Internal Revenue Taxation and representatives of the Treasury Department are continuing their studies of the revenue laws at the request of Chairman Doughton of the Ways and Means Committee. It is generally believed that Congress will be extremely reluctant to go along on any tax increase in 1950, but the studies are including revisions of existing tax laws, reductions in excise taxes, sources of revenue and tax evasion.

Apparently the coming session of Congress will witness a renewed drive for repeal of the Labor-Management Relations Act (Taft-Hartley), although the White House may yet find it necessary to invoke the Act's provisions to handle the coal mine wage dispute.

The resignation of Interior Secretary Krug, effective December 1, has been followed by the nomination of Under Secretary Oscar Chapman to this post. Chapman, a Roosevelt appointee, has been in the Department since 1933.

Coal Contract

Faced by the prospect that large numbers of coal miners would voluntarily return to work, and pressed by the governors of several states for the relief of serious conditions brought about by the strike, UMWA Chieftain John Lewis on November 9 ordered the men to return to the mines until "midnight, November 30, 1949, under the terms, wages and conditions of employment hitherto in effect under the wage agreement which expired July 1, 1949." In response to questioning at a White House press con-

ference, President Truman declared that he will use his powers under the Taft-Hartley Act whenever he decides that a national emergency exists. Lewis has now called his International Executive Board of over 200 miners' representatives to New York for a conference on further policies. He and his union have recently paid \$20,000 and \$1,400,000, respectively, in fines imposed by Judge T. Alan Goldsborough during the 1948 coal strike. These fines were assessed for contempt of court when Lewis and the UMWA failed to obey Goldsborough's order to return the men to the mines.

Welfare Fund Trustee

A rugged former Federal Judge from Kentucky has succeeded Ezra Van Horn as operators' trustee of the UMWA Welfare and Retirement Fund. Effective November 3, Judge Charles L. Dawson was approved by a majority of the signatories to the National Bituminous Coal Wage Agreement of 1948, to represent them in the stormy course of the Fund's administration.

In testifying on monopolistic practices of labor unions before the Senate Committee on Banking and Currency during August of this year, Judge Dawson stated that thoughtful people everywhere have been disturbed by the manner in which the power of great unions has been used and that they feel that, unless some solution is found, the inevitable result will be a national economy completely regulated and controlled by labor leaders. He emphasized that monopoly has been so used in the past 10 or 12 years as to seriously threaten not only the American competitive system in business, but the general welfare of all the people, and, ultimately, of the individual members of those unions themselves. He declared it is not only desirable, but necessary in the general public interest that the situation be corrected and that the only means by which it can be corrected is through legislation.



Washington Highlights

CONGRESS: Returns January 3.

COAL CONTRACT: Further strike doubtful.

MINERS FUND: Has new trustee.

STEEL SETTLEMENT: Complicates pension problem.

MONOPOLY HEARINGS: Stress union monopolies.

DELIVERED PRICING: F.T.C. suggestion.

MONETARY POLICIES: Increased demand for gold.



Steel Settlement

Now that steel workers in the main are back on the job, the terms of agreement made by the Bethlehem Steel Corp. are of interest: (1) \$100 minimum monthly pensions, including Social Security, after 25 years at age 65 or over, to be paid for by the company; (2) pensions payable after 15 years of service with a minimum of \$4.00 a month for each year of service up to 25 years; (3) no compulsory retirement at a specific age; and (4) disability pensions to begin at \$50 monthly. The social insurance plan included in the contract provides death, sickness, accident and hospitalization benefits costing 5¢ an hour, with the company and union members contributing equally. This plan provides a minimum of \$2,100 in life insurance with an average of \$3,000, and an average paid-up life insurance policy at retirement of between \$1,250 and \$1,500. The agreement must be approved by stockholders of the company by March 1, 1950, or it shall terminate on that date. It otherwise becomes effective October 31 and continues in effect until December 31, 1951. Under its terms the union may not reopen negotiations or strike over

the question of pensions until October 31, 1954.

Monopoly Hearings

An echo of much of the testimony presented on monopolistic practices of labor unions before the Senate Banking and Currency Committee last August has been sounded by representatives of industry appearing before a House Judiciary subcommittee investigating possible changes in the antitrust laws. Calling for application of the antitrust laws to labor monopolies, spokesmen drew attention to the industry-wide power exerted by the UMWA and CIO steel workers as examples of the need for a national policy to deal with labor monopoly.

Delivered Pricing

Following the near passage of the O'Mahoney Delivered Pricing bill, S. 1008, in the recent session, a Federal Trade Commission attorney is proposing that the FTC terminate an antitrust suit against a large number of steel companies which involves the basing point system of pricing. Under this proposal a cease and desist order would be issued under which the steel companies (1) would not take any cooperative action on freight rate factors for pricing purposes; (2) would not sell any steel products without first publishing f.o.b. plant prices and offering to sell at those prices; (3) would not agree on charges to be made for base products or extras; and (4) could absorb freight rates unless such action lessens competition unlawfully in any line of commerce.

Monetary Policies

In connection with hearings now under way before a joint House-Senate subcommittee on the Economic Report, Federal Reserve Board chairman McCabe is quoted as opposing any basic changes in Government monetary and fiscal policies. McCabe declared against convertibility of currency into gold and against any increase in the set price of \$35 per oz. Current laws authorizing purchases of silver by the Treasury were criticized by a number of bankers and economists and Treasury Secretary Snyder stated that his department "would interpose no objection if Congress wished to repeal all the provisions relating to acquisitions of silver."

Meanwhile, Executive Committee Chairman Burgess of the National City Bank has called for return to a full gold standard with free convertibility of currency on demand. He emphasized that gold redemption will serve as a brake on political spending and the drift to a welfare state. Burgess was joined by the National Foreign Trade Council in a public statement advocating free convertibility of the dollar into gold "on the basis of its present gold value."



IN EFFECT, many storage battery locomotives and shuttle cars run on "free power." This applies whenever a company can reduce its line power costs by reducing its peak-load demands, and is able to get all battery charging done during low-load intervals.

EDISON Nickel-Iron-Alkaline Storage Batteries are ideally suited to such service. Six or seven hours of charging during the off-peak period is normally all they need, because they can be charged at an average of full normal rate without injury. They require no critical adjustment of charge rates and can often be charged directly from d-c lines.

Their cells are built of rugged steel to withstand rough haulage duty, and contain an electrolyte which actually preserves the steel parts. Their electrochemical principle of operation is free from self-destructive reactions.

EDISON Batteries last and last, and so through the years cost less and less. If you do not already use them, get a current price quotation . . . you will probably find prices *much lower than you think*; annual operating cost *less than you pay now*.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES:
They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.



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STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto



Personals

Walter Hull Aldridge, president of the Texas Gulf Sulphur Co., is the 1950 recipient of the John Fritz medal, a joint award of the AIME, the ASCE, the ASME and the AIEE.

Mr. Aldridge was cited "as engineer of mines and statesman of industry who by his rare technical and administrative skills has importantly augmented the mineral production of our country and Canada, and who by giving unselfishly of his wisdom and vision has guided his professional colleagues to higher achievements."

Henry C. Woods, vice-president, Sahara Coal Co., was reappointed head of the vocational training and educational committee of the National Coal Association.

J. Bruce Clemmer, mineral technologist and administrator with the U. S. Bureau of Mines for more than 20 years, has been appointed Regional Director of Region VII, the Southeast, with headquarters at Tuscaloosa, Ala. Region VII includes the States of Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida.

Devereux C. Josephs was recently elected a director of the American Smelting & Refining Co. to fill the vacancy due to the death of Charles D. Hilles.

David H. Devonald has been elected vice-president in charge of labor relations and development for the Peabody Coal Co. **Frank L. White**, former assistant vice-president, has been elected vice-president in charge of mine operations.

Vernon L. Mattson, since 1944 chief engineer of the Consolidated Feldspar Corp., Trenton, N. J., has been appointed director of the Colorado School of Mines Research Foundation.

The Colorado School of Mines Research Foundation, organized early in 1949, is a nonprofit corporation to provide facilities for and promote research



and development in all types of mineral industry work.

Trustees of the foundation are **W. J. Coulter**, of the Climax Molybdenum Co.; **J. Paul Harrison**, of the American Smelting & Refining Co.; **Harvey Mathews**, of the Stearns-Roger Mfg. Co.; **Max W. Bowen**, of the Golden Cycle Corp.; president **Ben H. Parker**, professor **C. B. Carpenter**, and **Gurnett Steinhauer**, of the Colorado School of Mines.

George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., was guest of honor at the annual American Newcomen dinner held in Chicago early in November. Mr. Harrington addressed a group on "Coal Mining in Illinois," illustrating his remarks with motion pictures covering all phases of coal mining in the state from the pioneer days down to the present time.

Louis Ware, president and director of International Minerals & Chemical Corp., recently announced his resignation as a member of the board of directors of the U. S. Gypsum Co.

George Borgeson, has been named supervisor of safety of the newly combined Mesabi range safety departments of The M. A. Hanna Co., at Butler Brothers, located at Hibbing. **Walter Gunelson** has been assigned as assistant to the department.

Robert P. Koenig, president, Ayrshire Collieries Corp., discussed the coal industry's problems and possibilities at the December 16 meeting of the Chicago Wholesale group.

Donald H. McLaughlin, president, Homestake Mining Co., was elected president of the American Institute of Mining and Metallurgical Engineers for 1950.

Andrew Fletcher, president, St. Joseph Lead Co., and **Robert W. Thomas**, general manager, Nevada Consolidated Copper Corp., were elected vice-presidents.

Five new directors elected were: **Harold Decker**, assistant manager, Pan American Production Co. and Pan American Gas Co.; **Francis B. Foley**, superintendent of research, the Midvale Co.; **E. C. Meagher**, Texas Gulf Sulphur Co.; **Gail F. Moulton**, Department of Petroleum Economics, the Chase National Bank; and **Howard I. Young**, President, American Mining

Congress, and president, American Zinc, Lead & Smelting Co.

D. Dornenburg, formerly preparation superintendent, Carbon Fuel Co., Carbon, W. Va., has joined the staff of the U. S. Bureau of Mines as a mining engineer.

Howard I. Young, president, American Mining Congress, and president, American Zinc, Lead & Smelting Co., has been again nominated for the office of director of the Baltimore & Ohio Railroad Co.

Thomas E. Gettins, formerly safety director for the Lorain-Lorado mining operations of the Lorain Coal & Dock Co., has been transferred to the sales department, with Cleveland as his new headquarters.

Brent N. Rickard retired from active duty with the American Smelting & Refining Co. on October 1 because of ill health. However, he will remain with the company in an advisory capacity until July 1, 1950. For many years Mr. Rickard has been manager of the Tucson, Ariz., ore-buying office of A. S. & R. He has been succeeded as manager by **Reed F. Welch**, who has had extensive experience in the purchase of ores and concentrates, having acted as ore buyer in the Salt Lake City office since 1937.

Harold L. Beattie, former vice-president in charge of operations in northern West Virginia and Maryland for Davis Coal & Coke Co., has been appointed general superintendent of West Virginia operations for Warner Collieries Co.

E. C. Bitzer has been appointed executive vice-president and general manager of the Colorado Iron Works Co., following



the recent death of **T. A. Dickson**, president. Prior to joining the Colorado Iron Works Co. in 1941, Mr. Bitzer worked for various mining companies in the Philippines and Malaya as mill superintendent and metallurgical engineer. He has been active in the development of processes and equipment for the beneficiation of low grade ores and coal.

E. W. Beddow, chief clerk at the Copper Queen Smelter, Phelps Dodge Corp., Douglas, Ariz., has retired from active duty. Mr. Beddow went to the Bisbee district nearly 41 years ago as an employee of the old Calumet & Arizona Copper Co. and transferred to Phelps Dodge when that corporation acquired the C. & A.

Alan A. Sharp, mining engineer with the Safety Division, U. S. Bureau of Mines, has been transferred from the Phoenix, Ariz., office to Denver, Colo.

Claire E. McManus was promoted recently to the post of assistant to the general manager of M. A. Hanna Co.'s Minnesota mines.

C. J. Parkinson is now vice-president and director of Dragon Consolidated Mining Co., Tintic, Utah, an affiliate of Anaconda Copper Mining Co. and North Lily Mining Co.

Several personnel changes were recently announced by H. C. Rose, vice-president, Pittsburgh Coal Co. **J. T. Clark**, former superintendent of the Mathies Division, retired. **D. H. Davis**, assistant to the superintendent, Mathies Division, was made division superintendent. **Jacob Eichler**, formerly mine foreman at the Warden Mine, retired after 50 years of service with the company.

T. R. Mark, Jr., formerly with the U. S. Bureau of Mines at Duluth and Denver, has been assigned to the Billings, Mont., office to cover coal mine inspections in Montana, Wyoming, and North Dakota.

At the Thirty-Third Annual Meeting of the Harlan Coal Operators Association, **R. C. Scott**, general manager, Cornett-Lewis Coal Co., was elected president. **Marvin M. Ellison**, general manager, Southern Harlan Coal Co., was reelected vice-president, and **George S. Ward** was reelected secretary. Judge **Charles I. Dawson**, recently appointed as the coal industry's representative on the Board of Trustees of the UMW Welfare and Retirement Fund, discussed the duties of his new post. **James W. Haley**, secretary and general counsel, National Coal Association, was the principal speaker of the evening.

Charles W. Jeffers has been appointed chief of the Economic Cooperation Administration, Industry Division, succeeding **Samuel W. Anderson**, resigned. Mr. Jeffers has been chief of that Division's coal section for ECA in Europe since December, 1948.

Glenn C. Lee has been elected president of Hope Silver Lead Mines, Inc., following a reorganization of the Clark Fork, Idaho, mine's management. He replaces **Albert M. Nash**, former president and general manager.

Joseph E. Moody, president, Southern Coal Producers Association, addressed the annual meeting of the Hazard Coal Operators Association on November 17. **George Fitz**, president and general manager, Ajax Coal Co., was reelected president. **C. P. Gum**, general manager, Wisconsin Coal Corp., was elected vice-president and **L. A. Hopper** was reelected executive secretary and treasurer.

R. S. Cockle has been appointed mine superintendent for the Idarado Mining Co., Ouray, Colo., succeeding **George W. Murray**.

George McCaa has been made general superintendent of all mines in the Fairmont Division for Consolidation Coal Co. (W. Va.). **Harold B. Wickey** has been appointed assistant to the vice-president in charge of operations.

Ralph E. Calhoun has been appointed southwestern representative for the American Zinc, Lead and Smelting Co. Mr. Calhoun has been with the company in various capacities since 1924 serving at its East Tennessee properties, in the Joplin area, at Metaline Falls, Wash., and at Ouray, Colo.

Hayden Owens has been named to the newly-created position of assistant to the general manager for the Lehigh Valley Coal Co.

Harry J. Wolf is now engaged in private professional consulting practice at 420 Madison Avenue, New York 17, N. Y.

Oglebay, Norton and Co. announces that **Harrie S. Taylor**, former vice president in charge of mining operations, has been made president, succeeding **Crispin Oglebay**. Mr. Oglebay, president since 1925, becomes chairman of the board. **E. W. Sloan, Jr.** has been appointed treasurer, succeeding **Robert C. Norton**. Mr. Norton is now vice chairman.

— Obituaries —

John G. Holland, 74, veteran southern Utah and Nevada mining man, died October 10 in Cedar City, Utah. He had operated the Wood and Tayler coal mine near there for over 20 years.

William D. Ryan, Sr., 88, former arbitrator of the Southwestern Coal Operators, died November 17 in Kansas City, Mo.

James R. Hobbins, 66, president of the Anaconda Copper Mining Co., died in Butte of a heart attack on November 14. Mr. Hobbins joined Anaconda in 1922 as assistant to the president and became vice-president of the company in 1940. Just before his death, he ordered full scale resumption of the Greater Butte project, part of which had been suspended since June 6.

In addition to his position with Anaconda, Mr. Hobbins also was president of the Diamond Coal & Coke Co., the Butte Water Co., the Andes Copper Mining Co., the Chile Copper Co. and the Chile Exploration Co. He was vice-president and director of the Butte, Anaconda & Pacific Railway Co., a director of the National City Bank of New York, the Mines Investment Corp., the Copper Export Association, the American Brass Co., the Anaconda Sales Co., the International Smelting & Refining Co. and the Anaconda Wire & Cable Co.

In the untimely passing of "Jim" Hobbins, the mining industry has lost a dynamic leader and one of its ablest executives. As a director of the American Mining Congress his wise counsel and sound judgment have been of the greatest value to the entire industry throughout the past 15 years.



He will be sorely missed by all who knew him and had the privilege of working with him.

Solomon R. Guggenheim, 88, last of seven brothers who in 1899 founded the American Smelting & Refining Co., died November 3 at his home on Long Island, N. Y.

Mr. Guggenheim's first contact with the mining industry, that later became dominant in his activities, was in 1879. His family had become involved in a silver mine and he went to Leadville, Colo., to familiarize himself with the mining business. From this small beginning, under the guidance of Daniel, Solomon and Murry Guggenheim, the family expanded their activities into a world-wide mining organization.

Walter W. Stoll, 61, president and general manager of the Alaska-Pacific Consolidated Mining Co., died at Seattle November 12.

Mr. Stoll was founder of the company and discovered and developed the Independence mine, one of the largest lode gold producers in the territory.

J. Louis Van Zelm, 77, a director of the American Smelting and Refining Co., died December 11 at New Rochelle, N. Y.

Denver Cornett, a former president of the Harlan County Coal Operators Association, died November 23 at Louisville, Ky.

Walter B. Congdon, 66, died on October 20 while on a visit to Yakima, Wash. Mr. Congdon had a long career in the field of mining. He served as surveyor and foreman for the Oliver Mining Co., as purchasing agent for the Calumet & Arizona Mining Co. and was an officer and director of a number of smaller mining companies.

Glenn B. Heffelfinger, 60, assistant chief engineer in charge of large shovel design for Marion Power Shovel Co., died November 13 in Columbus, Ohio. He had been associated with the Marion company for more than a quarter of a century.

NEWS and VIEWS



Eastern States

Kanawha Operators Meet

At the Annual Meeting of the Kanawha Coal Operators Association, held October 20 in Charleston, W. Va., Julian Tobey, of Appalachian Coals, Inc.; J. V. Sullivan, secretary, West Virginia Coal Association; and J. D. Battle, National Coal Association, gave brief reports.

Officers for the ensuing year are: L. N. Thomas, president; C. C. Dickinson, Jr., vice-president; Harry G. Kennedy, executive secretary; and John L. Dickinson, treasurer.

Rising Costs Affect Compensation Fund

Speaking before the annual meeting of the West Virginia Coal Mining Institute, Jesse V. Sullivan, secretary, West Virginia Coal Association, urged that coal and other industries give immediate attention to the compensation fund for injured workers "before costs become so intolerable that coal and other subscribers abandon coverage."

Mr. Sullivan compared the situation in West Virginia to that existing in Pennsylvania a decade ago when the compensation law was so liberalized that many employers quit the fund and preferred to take their chances in court litigation. He suggested that a joint legislative commission be appointed to study the law. Such action in Pennsylvania resulted in the removal of objectionable features there.

Mr. Sullivan went on to praise the current mine safety record in West

Virginia, and stated that in the first nine months of the year the tonnage produced per fatality was 847,411 tons, highest in the history of mining in West Virginia. However, Mr. Sullivan warned that police powers for Federal inspectors will result in the destruction of the efficient state mining departments and added that too few people recognize that extension of Federal police powers will mean the liquidation of state departments created to safeguard human life many years before the Federal bureau was established for educational and scientific purposes.

Jet Piercing Gets Quarry Test

For the past six months the new JPA-2 unit of the Linde Air Products Co. has been under test at the Kingston, N. J., quarry of the Kingston Trap Rock Co. In tough diabase 3 in. minimum diameter holes have been pierced at rates as high as 15 ft per hour.

On the JPM-2 machine, which was designed primarily for experimental and demonstration purposes, the blowpipe can be advanced or retracted at

controlled speeds by means of an endless roller chain and sprockets at either end of the 8-in. diam tube which houses the mechanism. While drilling, the blowpipe is rotated by a drive bushing at the leading end of the housing and a keyway which runs the full length of the pipe. For drilling angle holes adjustment may be accomplished by means of a swivel which supports the entire mechanism at a point about 5 ft from the burning end. This machine has a maximum drilling depth of 20 ft, while the JPM-1 now in service on the Iron Range, can drill vertical holes up to a depth of 31 ft. Experimental work indicates piercing operations may be carried on to depths of 50 ft or more.

Safety Workers Meet Despite Strike

Even though no coal was being produced during the coal strike, mine safety meetings were held. On October 28 the Big Sandy-Elkhorn Mining Institute, Pikeville, Ky., held a safety meeting composed chiefly of superintendents, mine foremen, and assistant mine foremen.

Earl R. Maize, safety director of the National Coal Association, addressed the Pikeville meeting on the contents of the so-called mine safety bill now pending in Congress.

Conveyor Serves Fluorspar Mine

Near Marion, Ky., the Delhi Fluorspar Corp. has completed installation of conveyor equipment to facilitate barge loading on the Kentucky side of the Ohio River. A 62-ft long conveyor is included in the installation.

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Plant Maintenance Show

The first plant maintenance show will be held in the auditorium, Cleveland, Ohio, January 16-19. The four-day exposition, sponsored by the American Society of Mechanical Engineers and the Society for the Advancement of Management, will cover many subjects of vital interest to the mining industry.

Topics scheduled for discussion include: "Maintenance Organization and Management;" "Budgeting the Maintenance Operation;" "Upkeep of Motors, Controls and Distribution Equipment;" "Using Electrical Instruments in Maintenance;" and "Protecting the Worker." More than 100 exhibitors will give demonstrations of machinery, materials and methods for reduction of costs in plant maintenance.

Geiger Counter Tests Steel Samples

Scientists of the Research Laboratory of the United States Steel Corp. of Delaware have adapted the Geiger counter to quickly and accurately analyze steel samples. The Geiger counter analysis, after careful calibration, is expected to be much faster than the direct-reading spectrograph. In use, the Geiger counter measures invisible fluorescent rays, each of a special kind, that emanate from a steel sample when its atoms are ionized by a powerful X-ray. The iron samples are in no way disturbed and the steel sample is neither harmed nor changed.

An analysis may be made of any random section of steel rail or any other flat steel surface. In operation, a specimen may be bombarded with electrons or X-rays strong enough to ionize the various atoms; the process of electronic rearrangement of these atoms gives rise to secondary rays characteristic of the several elements

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present in the specimen. Measurement of the quantities of the various rays emitted is a short cut to chemical analysis. Alloying elements such as chromium, manganese, molybdenum and nickel, as well as copper, columbium, titanium, tungsten and vanadium can be detected and measured by this new method of analysis.

Coal Land Purchased

Purchase of 14,000 acres of coal land on the Pittsburgh seam has been reported to have been concluded by the Pittsburgh Consolidation Coal Co. The coal land is in Monongalia County, W. Va., and was purchased from the Cochran Coal & Coke Co.

Mercury Vapor Detects Fire Progress

At the underground gasification test being conducted at the Alabama Power Co.'s Gorgas Mine near Birmingham, Ala., progress of the fire is being followed by means of a General Electric electronic mercury-vapor detector.

In operation, small capsules of mercury have been placed in the path of the fire. The mercury-vapor detector keeps a constant check on the gases pouring from the mine. When the

fire, which may create temperatures as high as 3000 F, reaches a capsule, the mercury is vaporized and the instrument detects the fact.

Coal Mining Institute Meets

On December 15 and 16 the Coal Mining Institute of America held its sixty-third annual meeting. The proceedings took place in the William Penn Hotel, Pittsburgh, Pa.

Following the annual business meeting, held Thursday morning, the afternoon session of the meeting was devoted to discussions of roof support by means of bolting. Edward M. Thomas, mining engineer in charge, Roof Control Section, U. S. Bureau of Mines, and C. C. Conway, chief engineer, The Consolidated Coal Co., were the principal speakers.

Charles E. Lawall, assistant vice-president, Chesapeake & Ohio Railway Co., was the speaker at the 63rd annual dinner held Thursday evening.

J. J. Snure, production manager, Rochester and Pittsburgh Coal Co., and C. H. Snyder, president, Sunnyhill Mining Co., discussed their respective experience with continuous mining equipment on Friday morning. R. T. Artz, mining engineer, U. S. Bureau of Mines, spoke on ventilation and

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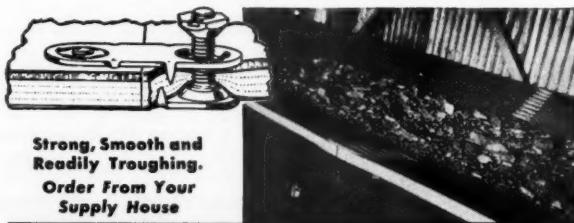
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other safety problems that must be met in connection with continuous mining equipment. That afternoon F. F. Dickmann, senior industrial engineer, West Penn Power Co., described electrically-heated devices for the mining industry. The current economic situation of the coal industry was presented by G. A. Lamb, manager of business surveys, Pittsburgh Consolidation Coal Co. J. D. Cooner, safety engineer, the Hudson Coal Co., outlined the safety program of his company.

Alabama Graphite Mine

A flake graphite mine producing material suitable for crucibles operates near Ashland, Ala., and employs 50 men. The Alabama Flake Graphite Co. of Birmingham sells most of its 400-tons-a-day output to the government.

Indium Production

The Consolidated Mining and Smelting Co. of Canada, has announced the addition of another metal to its list of products. Indium is now available in commercial quantities following a prolonged research program at the company's works at Tadanac, British Columbia.

Minute quantities of indium are present in the ore of the Sullivan mines. Recovery has been made possible because of the large scale operations at Tadanac. Indium is used in dental work, several kinds of plating, and for motor bearings.

Langeloth Slope Opened

In Washington County, Pa., the Union Coal Co. recently opened its new Langeloth slope mine planned for a daily capacity of 500 tons with a life expectancy of 15 years. Coal from the Pittsburgh No. 8 seam will be shipped via the Pennsylvania Railroad Co.

Safety Training

On October 4, some 1000 miners employed by the Hudson Coal Co., Scranton, Pa., began a 16-hour course in accident prevention sponsored jointly by the company and the United Mine Workers of America. The U. S. Bureau of Mines has furnished instructors for the eight two-hour sessions that comprise the course.

Steel Company Forms Coal Division

The Pittsburgh Mill Steel Co., New York, has formed a coal division which has already acquired exclusive sales franchises from several Pennsylvania and West Virginia coal producers. Negotiations are now being carried on for the acquisition of coal properties in both the bituminous and anthracite areas.

BEATING IT INTO AN OIL BURNER.

—By TALBURY



—TALBURY
The Washington Daily News

USBM Assists in Federal Coal Purchases

Through a system of coal sampling and analysis, the U. S. Bureau of Mines assists Federal agencies and military establishments in the purchase of about \$60,000,000 of bituminous coal and anthracite each year. Through this service, savings are effected on the purchase of coal and the agencies using the service are assured that coal shipments meet minimum specifications.

Technical advice is based on a file of coal analyses of the principal coal-producing beds of the country. This public file is open to all for guidance in the selection of coal.

New Tungsten Deposit

A report from the State Geological Survey of North Carolina announces that a tungsten deposit has been found near Concord, Cabarrus County. Exploration of the tungsten bearing area is being undertaken by Nash-Moore Mines, Inc.

Low Cost Maps

The U. S. Geological Survey recently announced that more than 3000 reports and 7000 maps have been published since the inception of the Survey in 1879. These provide basic information on the conservation, development and use of the nation's water, mineral and land resources. Accurate

topographic maps covering local areas of the United States may be purchased by addressing the Director, U. S. Geological Survey, Washington 25, D. C. About 500 new maps representing some 22,000,000 acres will be published in 1949.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1949.

City of Washington,
District of Columbia, as:

Before me, a notary public in and for the state and county aforesaid, personally appeared Bertha C. Wilkerson, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are:
Name of publisher, The American Mining Congress, Washington, D. C.
Editor, Sheldon P. Wimpfen, Washington, D. C.

Business manager, B. C. Wilkerson, Washington, D. C.

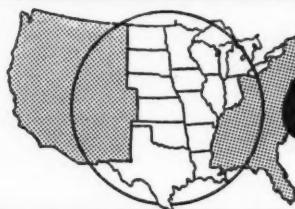
2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo.; Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

BERTHA C. WILKERSON,
Business Manager.

Sworn to and subscribed before me this 19th day of October, 1949.

KATHRYN A. HATHAWAY,
Notary Public.
(My commission expires July 31, 1952.)



Central States

Homestake Production High

During the third quarter of 1949 the Homestake Mining Co., at Lead, S. D., set a new postwar record for gold production. The mine reported 290,436 tons of ore mined, valued at \$4,143,466, during July, August and September. This was an increase over the second quarter production of 268,755 tons valued at \$3,708,714. Previously, during the postwar period, production has been less than \$3,600,000 worth of gold quarterly. General manager Guy N. Bjorge pointed out that the increased production was partially due to the greater number of employees on the payroll. The number of men employed is now over 2000, for the first time since before the war. Peak employment was at 2275 during 1935.

New Fluorspar Producer

The Golconda Mining Co., a newly organized firm which recently purchased the old Baker fluorspar mine, Harden County, Ill., is now producing ore from a 6-ft vein.

Washing Plant Construction

The Hill-Annex mine on the Mesabi range of Minnesota, a property of the Inter-State Iron Co., plans to construct a large addition to its washing plant during the coming winter. A Heavy-Media unit will occupy the new space together with the area now occupied by units 1 and 2 of the present plant. These are to be removed. Plans call for operation of the new plant in the 1950 season.

Illinois Geological Survey Appropriations

At the last General Assembly of the State of Illinois appropriations were made for the current work of the Illinois Geological Survey, for the biennium 1949-1951 in the amount of \$1,438,530. This is an increase of \$331,940 over the preceding biennium just ended. A higher level of salaries for the scientific and technical staff was authorized.

The new wing of the Natural Resources Building for the Geological Survey is approaching completion. It is being built at a cost of approxi-

mately \$880,000 and will virtually double the space now occupied.

At the present time the regular staff comprises 120 persons full time; 36 of these are geologists, 12 chemists, 2 physicists, 3 engineers, 3 mineral economists, 9 supervisory assistants, and 33 research and technical assistants.

Underwater Ore Stripping

On Rabbit Lake, near Crosby, Minn., on the Cuyuna iron range, the Union Construction Co. is stripping lake bed material preparatory to the development and future mining of iron ore.

To remove boulders too large for the dredge to handle, a digging ladder of a new design supplants the former basket type underwater cutter. The new ladder has a specially-built, double-sprocket chain which moves at the rate of 30 fpm. Spaced lugs pass

in front of the 20-in. suction pipe at the end of the ladder and kick aside rocks too large for the dredge pump to handle.

Magnet Cove Barium Mine Sold

Dresser Industries, Inc., of Cleveland, Ohio, large manufacturer of petroleum industry equipment, has purchased the Magnet Cove Barium Corp. of Houston, Tex., for about \$2,800,000 cash plus 17,515 shares of Dresser common stock. The purchased corporation produces mineral and chemical compounds used in preparation of "drilling mud," a heavy fluid employed by oil-well drillers to cool drill bits, remove cuttings and control high formation pressures. The company operates a barite mine at Magnet Cove, Ark., and a manufacturing plant at Malvern, Ark. Magnet Cove now supplies approximately 30 percent of the oil industry's "mud" needs.

Montreal Mining Co. Extends Shaft

Recently the Montreal Mining Co., Montreal, Wis., commenced deepening of its No. 6 inclined shaft from the 39th to the 40th level. This inclined shaft supplies the workings of the No. 5 deep mine which is equipped with a vertical shaft for ore production. For many years the Montreal

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mine has maintained production at the rate of 1,000,000 tons of iron ore per year.

The No. 5 shaft is bottomed at an elevation corresponding to 1100 ft below sea level and the No. 6 shaft, on reaching the 40th level, will be 2200 ft below sea level.

Oliver Begins Winter Operation

About the middle of November the Oliver Iron Mining Co. began its program of winter operations. Due to the lateness of the season no more ore will be shipped and work at the mines will be limited to stripping, underground mining, maintenance and other usual winter activity.

Included in the winter development and expansion program is the removal of 7,500,000 cu yd of overburden in preparation for active mining operations next spring. A new conveyor belt system and beneficiation plant will be built in the Canisteo district on the Mesabi range of Minnesota and a crushing and screening plant will be constructed in the Hibbing-Chisholm district of the Mesabi range. Preliminary construction work will be undertaken for the agglomerating plant near Virginia, Minn.

Iron Mine Employment Steady

Employment in the mines of Iron County, Mich., has remained fairly constant with a total of 1836 persons employed during the year ended August 31, 1949, as compared with 1729 in the previous year. This information was disclosed in the annual report of County Mine Inspector W. C. Melchiori.

Production at the mines tapered from a six-day week to five and later to the present four-day, 32-hour work-week.

Two mines, the Bristol mine of Inland Steel Co. at Crystal Falls, and the Bengal-Tully mine of the M. A. Hanna Co. at Stambaugh, are being restored to active production lists. They will soon join other productive properties in the output of iron ore.

Heavy Media Treats Iron Ore

At the Grant mine of the Inter-State Iron Co., near Buhl, Minn., a mobile heavy-media plant was installed where tests revealed that certain lean ores could be separated effectively by the heavy-media process. At the company's Hill-Annex mine a large tonnage of lean ore is available which tests have shown to be amenable to heavy-media separation. Plans are now in progress to convert two of the three present wash ore units at the Hill-Annex concentrator into a heavy-media unit. Remodeling will be completed during the coming winter and the plant will be ready for 1950 operations.

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PARIS, ILLINOIS

White Shirt Discovery

A new strike on the White Shirt lease near Joplin, Mo., was recently announced by the newly-formed S. S. & K. Mining Co. The ore is reported to average more than eight percent zinc and a good strike of lead ore was found at the 18-ft level.

Some years ago the lease was drilled by the Grasselli Chemical Co. On the strength of the previous findings, the present owners started prospecting operations. The Grasselli finds showed a 35-ft face of ore which was uncovered recently by a bulldozer. Most of

the overburden has been removed and the ore will be mined by means of a dragline and power shovel. Surface water entering the pit is being removed by a 3-in. centrifugal pump.

American Technical Leadership

At a dinner meeting of the Tri-State section of the AIME held November 8, 1949, at Joplin, Mo., Dr. L. E. Young, president of the institute, spoke on the subject "The Leadership of American Technicians in Industry." He said the dynamic initiative of the American man has been responsible to a

large extent for the rapid development of United States industries. Because business men fearlessly venture capital in the development of natural resources, we have the modern and progressive modes of present day life. He urged the improved cooperation of labor and management as a basic factor required to make future advancements in any field.

Dr. Young cited examples of lack of efficient administration in foreign countries and placed the blame in some instances on lack of good judgment and foresight. He commented that efficient administration by experienced business men has been one of the most fortunate factors in creating the powerful industrial economy of this nation.



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Mesabi Range Mapping Plans

The Iron Range Resources and Rehabilitation Commission of the State of Minnesota has approved the sum of \$30,000 to be matched by the U. S. Geological Survey, for topographic mapping of the Mesabi iron range. A considerable area has already been mapped by the U. S. Geological Survey near Aurora and Allen Junction. Continuation of the present program supported by both Federal and state funds will, it is hoped, result in a complete map of the Mesabi range in about three years.

The mapping program will be supervised by Ben K. Constantine of the Iron Range Resources Commission and G. M. Schwartz, director of the Minnesota Geological Survey.

Maintaining Mechanical Mining Equipment

(Continued from page 33)

with too small a radius and, in many cases, with a doubtful radius; seldom was there any widening of gauge along the curves. Operation of trains over such curves was unsatisfactory, hazardous and expensive. In order to remedy the difficulty, 18-in. gauge cars were changed to 17-in. gauge. No change was made in the gauge of the locomotive wheels, however. Some improvement was noted, but in later years, when the necessity for widening the gauge on curves was recognized and put into practice, the 17-in. gauge car wheels would, in many cases, leave the inner rail and wrecks would result.

The adoption of the Granby-type car forced a change in track laying "methods" and now excavations for curves, turnouts and timbering are made to fit a standard curve along which a train may be expected to travel smoothly. This improvement in trackage has lessened lost-time in trammimg, reduced maintenance time and expense and, most important, has reduced remarkably the incidence of trammimg accidents.



Western States

The Threat of Stagnation

Speaking before a recent conference of 11 governors of the Western States and the Governor of Alaska, Carl J. Trauerman, secretary-manager of the Montana Mining Association, stressed the importance of a strong and vigorous metal mining industry. "Small mines," Mr. Trauerman said, "are the 'seed corn' of the mining industry. The government," he continued, "is making it exceedingly difficult to prospect for more ore and open mines where ore has been located because it is changing the original land laws."

Mr. Trauerman pointed out several stimulants: continuation of the historic land laws with respect to claims on public lands; an increase in depletion allowance from 15 to 27½ percent, stabilization of prices so mining men can look to the future, building of stockpiles of vital defense metals "above ground rather than beneath it," and continued buying of gold by the government at its present price and permitting producers to sell gold on a world free market.

The group of governors recommended that the government "lend all encouragement to prospecting, exploration, and the development of mines producing essential minerals, especially with reference to small mines."

Gov. John W. Bonner of Montana, declared that the mining industry is in a state of stagnation. Gov. Vail Pittman of Nevada said the decline of the mining industry was harming his state's economy seriously, and Gov. Warren of California said stockpiling appeared to him to be the most sensible form of aid.

Rare Earth Deposits Found

An important discovery of rare earth minerals in an extremely unusual geological formation has been uncovered in southeastern California, according to a report by the U. S. Geological Survey. The deposit lies near Mountain Pass service station on Route 91 in San Bernardino County, 53 miles southwest of Las Vegas, Nev., and 33 miles northeast of Baker, Calif.

A preliminary geologic examination has been made by D. Foster Hewett of the U. S. Geological Survey who states that within an area of about

600 by 1500 ft, underlain by Archean rocks, there are at least five veins, three of which contain considerable bastnasite, a fluo-carbonate of cerium and lanthanum, with thorium and uranium. According to Mr. Hewett, the region is a potential commercial source of these two minerals which are at the present primarily derived from monazite, a mineral largely imported.

Nevada Porphyry Placer

Production is scheduled to start soon from the Nevada porphyry gold placers at Round Mountain, Nev., operated by Round Mountain Gold Dredging Co. of California. Installation of conveyors, power shovels and a large washing plant has been almost completed. The conveyor system has been tested and preparations have been made to work gravel from the first bench to a depth of 130 ft. The main conveyor belt, 1700 ft long, will carry gravel to the recovery plant. Much of the material will be mined from depths beyond reach of a bucket line dredge. Rich gravel was disclosed at considerable depth last year by drill holes and prospect shafts and large deposits are said to be available for mining. Water has been piped seven miles to the placers. Round Mountain is controlled by Yuba Consolidated Gold Fields of California and The Fresno Company.

Uranium Mill in Washington

Near Roslyn, Wash., a uranium concentrating mill is being speeded to completion after discovery of an extensive vein containing the radioactive element. The find is near the headwaters of the Clearwater River.

Arizona Mill Nears Completion

Shortly after the first of 1950 the Associated Mining & Milling Co. of Aguila, Ariz., plans to have its 200-ton mill completed and in operation. Considerable preliminary work has been accomplished, including the drilling of a 500-ft well that is said to be producing 300 gpm, an adequate supply for milling operations. The mill is designed to handle copper, gold and silver ore with some lead and zinc.

The foundation is in, a railroad siding completed, and an 88,000-gal water-storage tank erected.

Production for the mill will come principally from the Bullard mine, 12 miles northeast of Aguila, which the Associated Mining & Milling Co. has leased. Other sources of supply will be the Columbia mine, a copper-gold property in the Cunningham Pass district, the Little Giant and the Star. Provision is being made to accept custom ore.

During the construction period the company is employing about 20 men, but expects to double this number when production is under way. A. L. Poarch is general manager.

Greater Butte Project Resumed

Officials of the Anaconda Copper Mining Co. in Butte, Mont. have announced the authorization for full-scale resumption of the fire-filling program and other work on the Greater Butte Project, part of which was suspended on June 6. Work is continuing on the Kelley Shaft with the pouring of monolithic concrete. The present depth of the shaft is 587 ft.

Reopening of the Belmont mine, a copper producer, which was shut down in June, was also authorized. Production from the Belmont will be brought in as rapidly as miners are available. Also authorized was resumption of shipment of material from the zinc dumps.

Opal Mine Resumes Work

Work has been resumed at the Rainbow Ridge opal mine in Virgin Valley, Nev. The mine is noted for its output of fire opals. The famous Roebling opal in the Smithsonian Institute, now valued at \$250,000, was found at the Rainbow Ridge in 1919 and was sold at that time for \$1500. The black gem weighs 17 oz.

Custom Mill Closed

Shattuck Denn Corp.'s lead-zinc custom mill at Bisbee, Ariz., was closed November 1. According to J. A. Wilcox, superintendent, foreign-mined lead and zinc are being offered in the U. S. at prices below the cost of domestic production and therefore the mines which have been shipping to the Shattuck Denn plant are unable to operate profitably. The mill had been operating on a curtailed basis for some time because of insufficient ore supply.

Shattuck Denn's other properties, the Iron King mine and mill in Arizona and the Zuni Milling Co. in New Mexico, will continue "normal operations."

Gracie Mine Reopened

Reopening of the Gracie gold mine, one mile south of Nevada City, Calif., has been completed. Headframe and surface buildings have been erected and power units installed. The management reports that this work cost approximately \$35,000 and that the initial phase of the operation is expected to cost an additional \$50,000. New development includes driving a crosscut from the 350-ft level of the shaft to locate extensions of the ore bodies. The Gracie was purchased recently by Gracie-Glencoe Mines, Inc.

New Techniques Fight Coal Fires

The Rocky Mountain regional office of the U. S. Bureau of Mines has been successfully experimenting with new methods of extinguishing underground coal mines. According to John H. East, Jr., regional director at Denver, the easiest way to extinguish a coal mine fire is to suffocate it. The mine is sealed tightly and the fire, deprived of a supply of oxygen, dies out. In mines where this is not feasible, a new method of "starving" the flame by cutting it off from the fuel it feeds on has been devised.

The technique has been successfully applied to two Colorado coal mine fires in the past six months. The starvation technique requires an excavation

from the surface through the coal in the path of the fire. The cut is filled with noninflammable material, such as clay. When the fire reaches the barricade of clay it burns out. The first experiment with this technique was carried to a successful conclusion last spring at the I. H. I. mine near Rifle, Colo.

Unless the fire was extinguished this year, Mr. East estimated it would have been impossible to prevent it from destroying approximately 4,500,000 tons of some of the best coal in Colorado. The total cost of extinguishing the I. H. I. fire was about \$40,000, which was less than 1c per ton of coal saved.

The Bureau next turned to an 18-month-old fire in the sub-bituminous coal mine worked by the North Park Mining Co. on government-owned land near Coalmont, Colo. A trench was cut through 35 ft of overlying dirt and rock, 54 ft of coal and about 5 ft of combustible carbonaceous shale which lay under the coal bed. The trench was refilled with approximately 75,000 cu yd of clay. The fire was declared out in October. Officials have now announced they would try to extinguish an underground coal mine blaze in Moyer Gulch, near Gillette, Wyo., by the starvation method. The 40-ft vein is believed to have been burning for about seven years.

Mineral Industry Institute

The 23rd annual Mineral Institute will be held on the campus of the University of Washington on January 19, 1950. This year the theme of the meeting will place emphasis on metallurgy.

Nationally known speakers will address the gathering on the properties and uses of some of the lesser known metals.

Utah Uranium Find Confirmed

The Vanadium Corporation of America recently confirmed the discovery of a uranium-bearing deposit six miles from Marysvale, Utah. D. W. Viles, vice-president and general manager of the corporation, reports that all signs indicate that the deposit is the largest yet found in the Rocky Mountain region. The company has hopes for enough development there to support a processing plant. "The surface showing of uranium in the ore is very good; better than the average content of this important substance," Mr. Viles said. "We are just starting underground development at the scene to prove the extent of the deposit."

A Marysvale miner, Pratt Seegmiller, found the autunite deposit about a mile south of the Yellowjacket mine, once a famous producer of rare metals. The ore body, according to Seegmiller, was found, by diamond drilling, to be about 800 ft long and extend to a depth of 35 ft on a dip of 30 deg. Width has not yet been determined. The autunite is said to average from 0.36 to 0.76 percent uranium, compared with carnotite's 0.1 to 0.2 percent.

The corporation has bulldozers working over a two-mile area. Further development and metallurgical tests are expected to take about six months, according to Mr. Viles. At present the ore is being trucked 355 miles to Naturita for testing.

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You'll be as amazed at the advancement in drilling speeds made possible by Rok-Bits CROWNED carbides over the conventional type, as you were with carbides showing over steel. Check your present drill bit performance against Rok-Bits, if you are not already using them—and see. Write for details of trial offer and Rok-Bits field-tested 5-way betterment. **ROCK BIT SALES & SERVICE CO.** 2514 East Cumberland Street, Philadelphia 25, Pa.

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Winnemucca Mountain Mines

A mill with a 50-ton daily capacity will be installed at the property of the Winnemucca Mountain Mines Corp. near Winnemucca, Nev., company officials recently announced. A pilot plant has been operated for several months, treating five to ten tons a day. Manager G. Rogers states that old workings in the Rexall gold mine are being reconditioned preliminary to connection with the main Winnemucca Mountain tunnel, now 1800 ft long. The tunnel is to be extended approximately 600 ft to virgin ground in the Rexall below the old productive area. Estimated to contain 40,000 tons of developed ore, the Rexall has produced rich gold ore at intervals since 1907. The main Winnemucca Mountain property is said to contain a series of milling grade veins carrying gold, silver and copper.

Hillside Improves Ventilation

The Hillside Mining & Milling Co., Hillside, Ariz., has installed a blower on the 1000-ft level and is repairing raises from the 700 to 400 levels. When this work is completed, ventilation and cooling of the 1000 and 900 levels will be greatly improved. Production from the Hillside is running at the rate of 1500 tons monthly of lead, zinc, silver and copper ore, an increase from the 1200 tons in May and 1000 tons of a year ago. Forty-six men are employed on a two-shift basis under the direction of E. R. Dickie, manager.

Sunshine Explores Uranium Claims

The Sunshine Mining Co. of Kellogg, Idaho, has entered into an operational agreement with the Elkhorn Mining Co. of Boulder, Mont., on the Free Enterprise group of lode mining claims. Members of the geological and engineering staffs of Sunshine have been engaged in making examinations of the radio-active exposures.

The Elkhorn Mining Co., through the efforts of its president, Wade V. Lewis, acquired the Free Enterprise group of claims. The agreement with Sunshine places the latter company in charge of all operations in connection with the search for economic bodies of radioactive rock.

Exploration work to date consists of completing a hoist and compressor house, installation of a new compressor, building a new headframe and the retimbering of the old shaft to its original depth of 85 ft. Considerable radioactive material has been brought up during the retimbering operation. It is understood the shaft will be sunk further and crosscutting undertaken to determine the possibilities of uranium recoveries. Rowland King of the exploration department of Sunshine is supervising the work and W. B. Foster is in charge of the work at the shaft. Exploration work will also be started soon at another uranium possibility on Clancy Creek, also under option to the Elkhorn company.

Yuba Plans Redredging

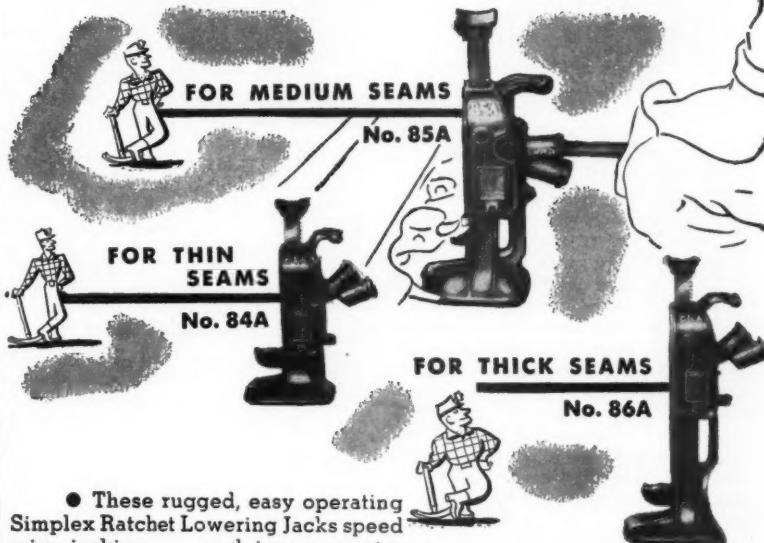
Yuba Consolidated Gold Fields is working deep gold placers in the Hammonton area near Marysville, Calif., with six giant dredges, each equipped with 18-cu ft buckets. They dig to a depth exceeding 100 ft and handle approximately 450,000 cu yd a month. The company is completing preparations for redredging 5000 acres in the Hammonton field, and plans to resume work soon at its Sunny View property south of Chico, where operations were suspended in 1942. Reconditioning of the Sunny View dredge has been almost completed. Yuba Consolidated is conducting operations at the highest level since 1941 and reported recovering approximately 100,000 oz of fine gold a year.

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• These rugged, easy operating Simplex Ratchet Lowering Jacks speed mine jacking . . . and insure greater safety. Proved and used in every type of mine, Simplex Jacks can be depended upon to step up efficiency; to cut time and costs on lifting, lowering, leveling and other jacking jobs.

Every Simplex Ratchet Lowering Jack is built to lift full rated capacity on cap or toe. Each guarantees maximum service with these features:

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No. 86A—FOR THICK SEAMS

5 Tons capacity—20" high—12" lift. For coal cutting and loading machines, resurfacing mine cars and light locomotives, shop, track work, etc.

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THE COMPLETE SIMPLEX LINE OF MINE JACKS
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Safer Roof Control with SIMPLEX MINE ROOF JACKS

Three Types of Heads

"FS" Flat Swivel for use with wooden pieces—as shown on jack at left.



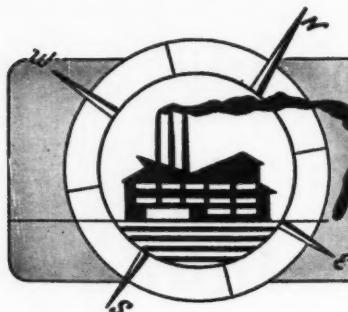
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Manufacturers Forum

New Single Pass Drill Bits

Early in November the Timken Roller Bearing Co. announced production of a one-use "Spiralock" rock drill bit designed for fast drilling at low cost.



Features claimed for the new bit are ease of placing it on and taking it off the drill steel and assurance that the bit will not come off the steel while drilling. The scalloped back face of the bit is said to prevent chips from packing behind it.

The "X" cutting edge is designed to prevent rifling. The "Spiralock" union is said to be simple to prepare and recondition. Rod ends may be prepared by machining or forging.

Wetting-Down Hose

A new water hose, designed primarily for use in coal mines for wetting down dust, has been announced by the B. F. Goodrich Co., Akron, Ohio. The orange colored hose is available in $\frac{3}{4}$ -in. size with $1\frac{1}{16}$ -in. outside diam.

Film Tells Engineering Story

A new sound 16-mm film entitled "A Hidden World" has been produced by Allis-Chalmers Mfg. Co. Superimposed on the background of a young man's uncertainty in choosing his career, the film tells the story of engineering in action.

Many of the modern day conveniences that engineering has made possible are delved into to illustrate the important engineering thought and action that must be coordinated to produce the facilities of modern, every-day life.

Energized Lubricant

The frequent need to lubricate plug valves is said to be eliminated by a new lubricant called Hypermatic produced by the Nordstrom Valve Division of the Rockwell Manufacturing Co., Pittsburgh 8, Pa.

In use, the pressure exerted in injecting the lubricant into the valve

powers the lubricant. The stored energy is released later when needed to feed the lubricant into any voids that may occur within the pressurized ducts of the valve system.

Valve efficiency is expected to be increased by Hypermatic by keeping valves in a fully lubricated state; by decreasing frequency with which lubricant has to be added to the valves; and by maintaining the valves in operable condition for emergencies without first shopping to re-lubricate.

Dragline Bucket Chains

Taylor-Wharton Iron & Steel Co., High Bridge N. J., is now producing a line of Tisco cast manganese steel dragline bucket pulling and hoist chain of full bearing design. It is claimed that this design provides longer life and fewer repairs.

Hydraulic Coal Drill

Salem Tool Co. has available a new hydraulic coal recovery drill which will handle augers up to 36 in. in diameter. Holes may be drilled as deep as 120 ft. Drill may be equipped with either gasoline, Diesel, or electric power. Exposed coal has been recovered at the rate of 45 to 110 tons per day with this new hydraulic McCarthy coal drill.

Side Dump Trailer Train

Two large capacity semi-trailers, coupled by means of a pneumatic-tired dolly, make up the new 44-ton, side-dump trailer train built by Easton Car & Construction Co., Easton, Pa. Each trailer of the doublebottomed unit is equipped with a drop-door, side-dump body of 22-tons capacity. Gross

High Speed Diesels

Two new six-cylinder, high-speed Diesel engine models designed for on-highway and off-highway automotive applications have been placed in production by the Cummins Engine Co., Inc. Both the HRBB-600 and HRBB-600 models have a maximum rating of 175 hp at 2000 rpm.

Each of the two new engines are said to be a fully counterbalanced crankshaft; newly designed camshaft; viscous-type torsional vibration damper, and a revised fuel pump.

Lightweight Hoist

Constructed of aluminum alloys, a lightweight winch-hoist called the Lug-All is built by the Lincoln Precision Machining Co., N. Grafton, Mass. The $8\frac{1}{2}$ -lb unit is reported to be capable of carrying a $1\frac{1}{2}$ -ton load. Loads are raised and lowered by an interlocking pawl arrangement. A 20-in. reversible safety handle is designed to bend in case of accidental overload before any part approaches the breaking point. The Lug-All is rigged to lift, pull or lower $1\frac{1}{2}$ tons for $7\frac{1}{2}$ ft, or $\frac{3}{4}$ ton for 15 ft. A built in "snatch block" and three swivel hooks permit work around corners or in close quarters with as little as $10\frac{1}{2}$ in. between hooks.



Low-Head Crane Block

With a capacity of 10 to 15 tons, a new "low-head" crane block has been produced by American Hoist and Derrick Co., St. Paul 1, Minn. The new block has a shorter over-all length and permits 1½ to 2 ft higher lifts without lengthening the boom. Detailed information may be obtained on application to the manufacturer.



Rear Dump Trucks

The Euclid Road Machinery Co. has announced availability of the Model UD rear dump Euclid with a struck measure of 6.6 cu. yd and a 10-ton



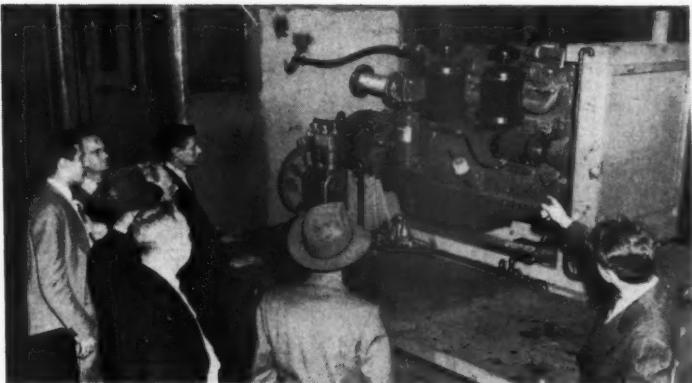
payload capacity. The model UD is powered by a 125 hp Diesel engine for heavy off-the-highway hauling in construction, mine, quarry and industrial work. Top speed with capacity payload is 35.7 mph.

Crowned Carbide Bits

Crowned tungsten-carbide inserts designed to increase drilling speeds, plus chip channels to promote self-cleaning, are among the features claimed for "Rok-drill" bits manufactured by the Rock Bit Sales and Service Co., Philadelphia 25, Pa. To overcome premature thread failure,



Rok-Bit threads are designed specially for each bit size and application. Improved blowing and reduced air consumption are claimed for the bits. The "Rok-bit" is of the detachable type and available in the two-point chisel type or the four-point cross bit type.



Locomotive Operators School

In its Erie, Pa., plant the General Electric locomotive and car equipment division offers instruction in the operation, inspection and maintenance of switching locomotives. The week-long classes are offered free of charge to selected customer personnel.

The course is designed to familiar-

ize operators with the fundamentals of operation, service and maintenance of Diesel engines and Diesel-electric drive in order that customers may be assured of better service and longer life for this equipment. A part of the course consists of tours through the Erie works.

— Announcements —

The Pennsylvania Crusher Co., Division of Bath Iron Works, has announced the promotion of Woodrow W. West to chief sales engineer with headquarters at the main offices of the Crusher Division, Philadelphia.

Dr. Peter Van Wyck is now assistant director of the experiment station of the Hercules Powder Co. and Dr. Richard S. George is assistant director.

Otto V. Norvig was recently appointed sales engineer of the crusher and process machinery divisions of Nordberg Manufacturing Co.

The Morrow Mfg. Co., Wellston, Ohio, has announced that its name was changed to the McNally-Pittsburgh Mfg. Corp., effective December 1.

Newton R. Crum has been named representative for the Flexible Steel Lacing Co. in California.

Max L. Murdock, acting manager of the centrifugal pump department at Allis-Chalmers Norwood (Ohio) Works, has been promoted to manager of the department succeeding H. C. Gaton, retired.

Eugene P. Berg, formerly general superintendent of the Link-Belt Pershing Road Plant in Chicago, has been promoted to the newly created position of assistant general manager. Richard Moyer, formerly superintend-

ent of the steel shop, has been appointed general superintendent of the manufacturing department.

Robert L. Frazer has been appointed representative for the Joy Manufacturing Co. in Spokane, Wash.

Edwin M. Perrin, formerly advertising manager of the Robins Conveyors Division of Hewitt-Robins, has been appointed advertising manager of Hewitt-Robins, Inc., New York City.

A. P. DeVita has been appointed New York district sales manager for Robins Conveyors Division of Hewitt-Robins, Inc.

W. E. Lunger, formerly district manager of the Huntington, W. Va. plant of the American Car & Foundry Co., has been appointed assistant vice-president in charge of production with headquarters in New York City. J. E. Koontz succeeds Mr. Lunger at Huntington.

J. J. Huether, manager, Central Station Divisions, General Electric Co., has announced the appointment of Richard Cutts, Jr., as manager of sales for Central Station Divisions Apparatus Department.

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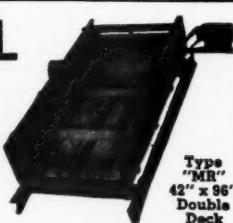
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AREAS BY OUR STOP GROUT METHOD
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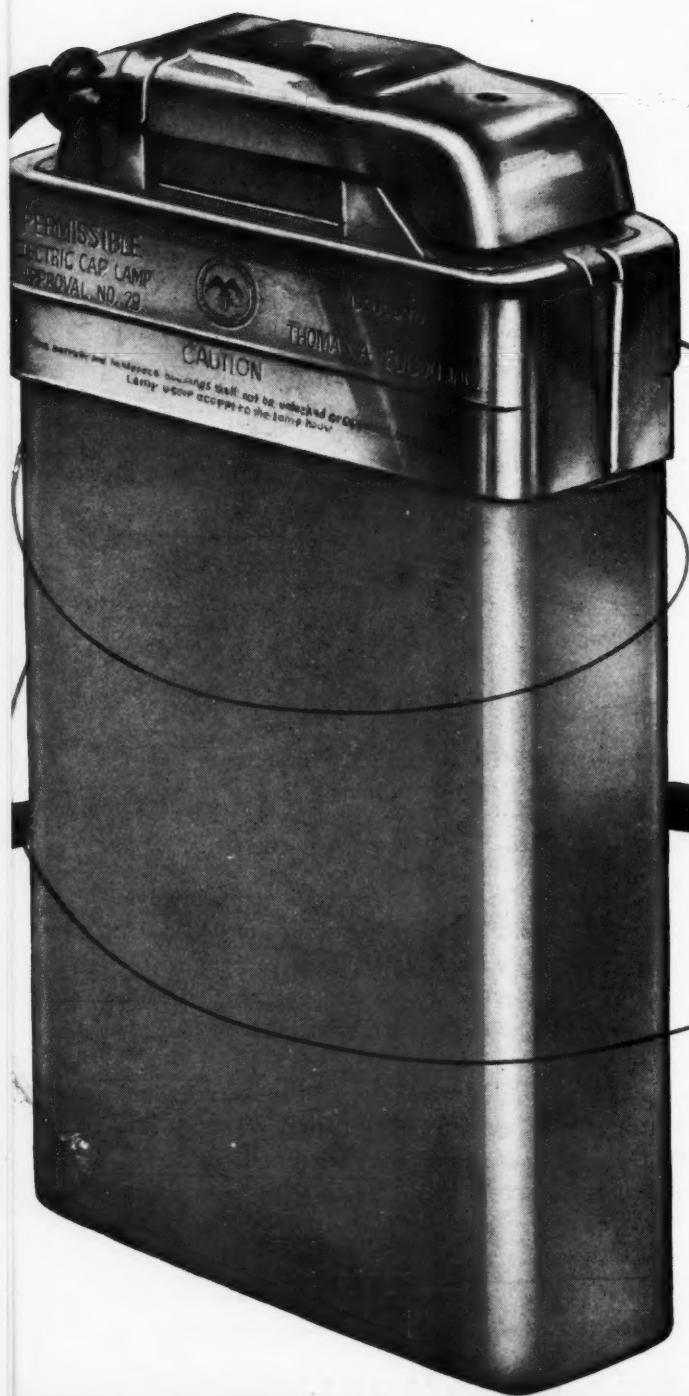
AMERICAN CYANAMID COMPANY

EXPLOSIVES DEPARTMENT



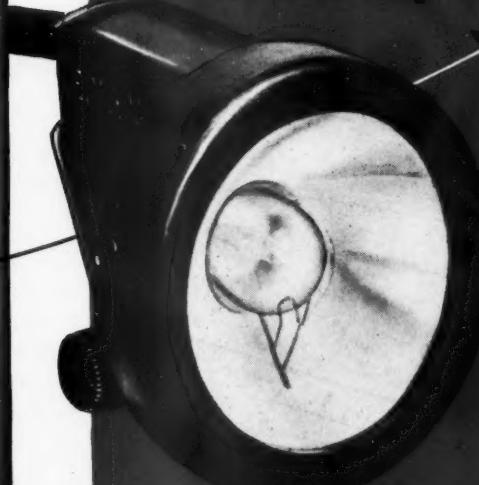
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BETTER EDISON LIGHT to work by—light in 25% greater volume, and higher-than-ever beam candlepower—means better safety for the mine and more tonnage per man per shift.

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